

CONTINUATION OF THE
BULLETIN OF THE NUTTALL ORNITHOLOGICAL CLUB

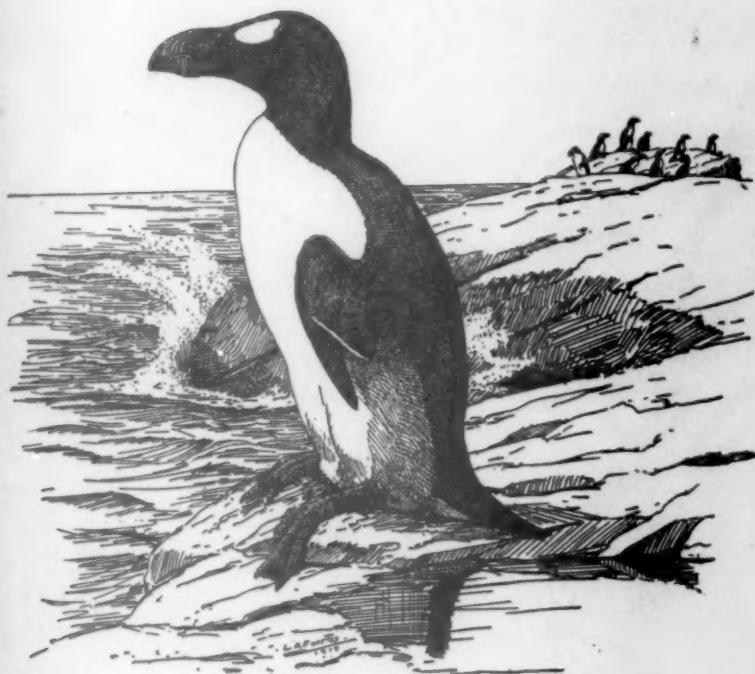
The Auk

A Quarterly Journal of Ornithology

Vol. 62

JULY, 1945

No. 3



PUBLISHED BY

The American Ornithologists' Union

LANCASTER, PA.

Entered as second-class mail matter in the Post Office at Lancaster, Pa.

Accepted for mailing at special rate of postage provided for in the Act of October 3, 1917, embodied in paragraph 4, section 538, P. L. and R., authorized May 15, 1920.

CONTENTS

CHIMNEY SWIFTS ROOSTING AT ARDMORE, PENNSYLVANIA. By <i>Horace Groskin</i> (Plates 16-17)	361
THE BIRDS OF ROCKY MOUNTAIN NATIONAL PARK, COLORADO. By <i>Fred Mallory Packard</i>	371
NOTES ON SWAINSON'S WARBLER IN CENTRAL GEORGIA. By <i>Brooke Meanley</i> (Plate 18).	395
BARROW'S GOLDEN-EYE IN MASSACHUSETTS. By <i>Ludlow Griscom</i>	401
AN EXAMPLE OF BUMBLEFOOT IN THE GREAT HORNED OWL. By <i>Dayton Stoner</i> and <i>Lillian C. Stoner</i> (Plate 19)	405
A SYSTEMATIC STUDY OF THE MAIN ARTERIES IN THE REGION OF THE HEART— AVES VI. By <i>Fred H. Glenny</i>	408
THE 1944 HURRICANE IN NEW ENGLAND. By <i>Norman P. Hill</i>	410
EFFECTS OF A TORNADO ON BIRD LIFE. By <i>H. Elliott McClure</i> (Plate 20)	414
COMMUNITY SELECTION BY BIRDS ON THE HELDERBERG PLATEAU OF NEW YORK. By <i>S. Charles Kendeigh</i>	418
TWENTIETH SUPPLEMENT TO THE AMERICAN ORNITHOLOGISTS' UNION CHECK- LIST OF NORTH AMERICAN BIRDS.	436
GENERAL NOTES.—Nesting habits of the Peruvian Gray Gull (Plate 21); Longevity record of Black-cheeked Weaver; An unusual note of the White-crowned Sparrow; John Bartram on the Passenger Pigeon in Florida; The food of the Red-shouldered Hawk in New York State; Food of Ruffed Grouse in southern Michigan; American Rough-legged Hawk found dead at Crawfordsville, Indiana; Food habits of Sanderlings; Blue egg in a Pheasant's nest; Heat insulation in the tarsi and toes of birds; English Sparrow eating salt; The sequence of molt in Purple Grackles; Notes on the Duck Hawk in Ashland County, Ohio; On the type of <i>Cassicus melanurus</i> Cassin; Forster's Tern in North Carolina; Canada Jay in Connecti- cut; Black-crowned Night Heron in Washington, D. C.; Bald Eagles and Woodcocks in central-western Illinois; A further record for the Double-crested Cormorant from the Pleistocene of Florida; Yellow Rail nesting in Massachusetts; A Dovekie in Connecticut; Connecticut Warbler in Vermont; <i>Cypseloides major</i> in Bolivia; American Merganser in Puerto Rico; Hooded Merganser in St. Croix, Virgin Islands, U. S. A.; Sight record of the Western Grebe on Long Island; <i>Branta c. hutchinsi</i> on the Atlantic coast; Arkansas King- bird in southeastern Florida; Chestnut-collared Longspur on Long Island; Interior records of brant; Redhead breeding in New Brunswick; Two unusual records for North Carolina	450
RECENT LITERATURE.	466
NOTES AND NEWS	488

THE AUK

A QUARTERLY JOURNAL OF ORNITHOLOGY

VOL. 62

JULY, 1945

No. 3

CHIMNEY SWIFTS ROOSTING AT ARDMORE, PENNSYLVANIA

BY HORACE GROSCHIN

Plates 16, 17

THE recent discovery of the winter home of the Chimney Swift, *Chaetura pelagica*, in northeastern Peru, South America, has centered attention on the particular routes travelled by the bird in its spring and autumn migrations. Lincoln (1944) states: "Data now available will make possible a detailed study of the migration routes of the swifts in North America."

During the past several years, about 375,000 swifts have been banded, mostly in the southern part of this country, and while these banding records, including the returns and recoveries resulting from them, are of the highest importance in the study of the swift's migrations, observations of large congregations of swifts roosting in chimneys during their migrations in other sections of North America would also add important information of value in determining the exact routes travelled. It would, therefore, appear to be of interest to record a very great flock of swifts roosting in a chimney in the northeastern part of the United States.

During the late summer and autumn of 1944, continued series of observations were made of an unusually large concentration of Chimney Swifts at a chimney standing in a suburb of Philadelphia, at Ardmore, Montgomery County, Pennsylvania. This chimney is a part of a modern department-store building erected in 1929, and is, in fact, a double chimney, divided by a brick wall in the center, one half being used as a fire chimney, and the other half as a ventilator flue. The swifts used the ventilator flue for roosting. The height of the chimney is eighty-three feet, sixty-eight feet above the surface of the ground and fifteen feet below ground to a basement. It is brick-lined through-

TABLE 1
CHIMNEY SWIFTS ENTERING CHIMNEY BETWEEN
AUGUST 21 AND OCTOBER 11, 1944

<i>Date</i> 1944	<i>Number of Swifts</i>	<i>Entrance period</i> E. W. T.	<i>Weather</i>	<i>Temperature F.°</i>
<i>August</i>				
21	1,000	7:55-8:05 P. M.	clear	80
22	2,100	7:45-8:00 P. M.	clear	75
23	1,300	7:50-8:05 P. M.	clear	80
25	3,300	7:50-8:05 P. M.	clear	69
27	5,800	7:55-8:08 P. M.	clear	68
29	6,100	7:40-7:59 P. M.	clear	68
30	5,350	7:40-7:57 P. M.	clear	72
31	7,160	7:30-7:55 P. M.	overcast	76
<i>September</i>				
2	6,700	7:40-8:00 P. M.	clear	82
3	6,600	7:45-8:00 P. M.	clear	82
4	9,120	7:25-7:47 P. M.	overcast	76
5	10,350	7:20-7:45 P. M.	clear	79
8	4,980	7:15-7:40 P. M.	clear	68
19	6,250	7:02-7:20 P. M.	heavy overcast	72
20	8,110	6:57-7:22 P. M.	heavy overcast	70
21	11,150	6:50-7:25 P. M.	clear	78
22	11,750	7:00-7:25 P. M.	clear	66
23	10,820	6:40-7:35 P. M.	clear	53
24	12,620	6:35-7:17 P. M.	clear	58
25	8,540	6:30-7:13 P. M.	clear	60
26	11,290	6:35-7:21 P. M.	clear	68
27	12,100	6:45-7:15 P. M.	clear	72
<i>October</i>				
2	6,530	6:35-7:07 P. M.	clear	66
3	estimate—300	4:10-4:25 P. M.	heavy overcast	48
4	estimate—200	4:10-4:20 P. M.	heavy overcast	56
5	8,020	6:15-6:50 P. M.	overcast	66
6	7,485	6:35-7:06 P. M.	clear	68
7	3,960	6:40-7:00 P. M.	clear	74
9	1,155	6:35-6:52 P. M.	clear	58
10	170	6:35-6:50 P. M.	clear	60
11	4	6:25-6:40 P. M.	clear	58

out. The inside dimensions of the ventilator flue are three by four feet. The mouth of the chimney is about six feet above the roof of the building. Since the chimney is situated within ten minutes walk from my residence, it afforded me an unusual opportunity to make frequent observations without difficulty.

My attention was first attracted to this chimney on August 23, 1943, when I discovered about 300 swifts circling it at dusk, and while

observations were continued frequently until October 28, 1943, I made no special notes. During the season of 1944, observations began on August 21 and ended October 11. I was informed, however, that the swifts had started roosting in this chimney during the first week of August, at a time when I was absent from home. During the period of August 21 to October 11, thirty-one observations were made in late afternoon to dusk and twelve were made in the morning, to note the manner in which the swifts departed from the chimney.

The swifts were counted each evening as they entered the chimney. The method used in making the count was to take a position on the ground within fifty feet of the chimney, where three sides of its mouth were in full view, and as the swifts began entering it rapidly and in numbers, the count started, based on an estimate of ten swifts per second entering the chimney. When the swifts stopped entering, at intervals, the count was suspended, and when they started again, the count was resumed. To be sure, this method of counting is not absolutely accurate, but it does give an approximate number that is much closer to the actual figure than the usual estimates. Counting at the rate of ten per second is considered conservative by other observers. Linton (1924) observed and counted a large flock of swifts entering a chimney at Augusta, Georgia, and states: "They were entering at the rate of fifteen or more per second." However, since the birds are continuously changing their rate of speed, from time to time, as they enter the chimney, I believe ten per second gives a more conservative and a better average. It will be noted, by reference to Table 1, that more than 5,000 swifts entered the chimney each evening during twenty evening observations and more than 10,000 dropped into the chimney each evening on seven observations.

The largest number of birds entering the chimney in one evening was 12,620 on September 24. The peak of abundance occurred between September 21 and September 27, when more than 10,000 swifts roosted there each evening except September 25, when the number dropped to 8,540. After the peak had been reached during the latter part of September, the number of birds going into the chimney decreased rapidly. On October 2, 6,530 entered it and by October 11 the last four swifts for the season entered it. After this date observations were continued until October 22, and while small flocks of swifts were seen in the air close to the chimney on October 12, 14, 15 and 16, no swifts entered it after October 11.

The time consumed for flocks of more than 10,000 birds to enter the chimney in one evening varied from twenty-five to fifty-five minutes, or an average of thirty-seven minutes.

It may also be noted, by reference to Table 1, that there was a considerable variation in the number of birds going into the chimney on different evenings. This probably indicates an exchange in the roosting flock of which a certain percentage may have moved southward, while other birds from the north arrived to take the vacant place. Lowery (1939), who banded many thousands of Chimney Swifts at Baton Rouge, Louisiana, states that: "Banding records indicate that flocks are continuously changing in individual composition. When an interval of about ten days is allowed to elapse between trapping dates at any one chimney, the composition of the flock is observed to have changed almost entirely."

During several evenings, while the swifts were entering the chimney at Ardmore, photographs of them were taken by flashlight, and they were also photographed inside the chimney while clinging to the walls. They began clinging to the inside walls about six feet below the mouth of the chimney and, when the top rows were occupied, the birds that followed took a position on the walls immediately below those above. The photographs of the swifts inside the chimney (Plate 16) show how closely massed they are when roosting, and show how such large numbers of them are able to roost in a single large chimney.

There appears to be a difference of opinion about the exact position of the swifts when roosting. E. K. and D. Campbell (1926) observed more than 100 swifts roosting on the bark of an oak tree at Cold Spring, New York. They state: "The birds seemed two or three deep. They snuggled together seemingly to keep warm and the heads all concealed beneath the wings of those above." Audubon (1840) observed a great flock of swifts at Louisville, Kentucky, roosting in a large hollow sycamore tree. After the birds had retired for the night, he examined the inside of the tree with a lantern, and he writes: "In no instance did I see one above another." It is assumed he meant that the swifts were not on top of each other. An examination of the photographs of the swifts inside the chimney at Ardmore (Plate 16) will show that these swifts are not clinging to the walls two or three deep and that their heads are not precisely concealed beneath the wings of the birds above. Audubon's statement that the birds are not one above another is substantially correct. However, the photographs do show the birds overlapping to some extent. It will be noted that the bird below rests its head at the base of the tail of the bird above it, while the tips of the primaries of the upper bird rest on the upper back of the bird below. This overlap may be seen clearly in the upper part of the lower photograph, slightly to the right of the center, where two swifts are a little distance away from the mass of birds and are clinging to the wall one above the other.

Many observers have described the manner in which the swifts circle and enter the chimney in the evening, but there are comparatively few published observations of how they depart from the chimney in the morning. It is apparently the general impression that they arise at daybreak and pour out of the roosting chimney or tree. Audubon (1840), observing a large flock of swifts leaving a hollow tree at daybreak, writes: "The 'swallows' are now pouring out in a black continued stream." Winsor Marrett Tyler, who contributed the study of the Chimney Swift in Bent (1940), makes the statement: "At daybreak, as the birds pour out of the chimney where they have roosted during their autumnal migration" Pickens (1935) had a different experience, after having made four morning observations at a chimney in Columbia, South Carolina, and states: "Their irregular rising is quite as intriguing a habit as their evening drill."

During the twelve morning observations at the Ardmore chimney, it was noted that the swifts came out of the chimney at different times in the morning, from daybreak to as late as 11:40 A.M. In none of the morning observations did they start pouring out of the chimney at daybreak. Usually, when they started leaving the chimney, they came out two or three at a time, and at short intervals the departing flocks increased to three and four individuals; then at intervals of a few minutes, increased to six or eight. Soon thereafter there would be a stream of birds coming out for a few minutes at the rate of three to five per second. After reaching stream proportions, there would be a reduction to small flocks of three to five birds leaving at a time, and this would gradually work up again to a stream of birds. Also, at short intervals, the swifts often stopped coming out altogether for several minutes, and then started again in small flocks of three to five at a time.

It was interesting to note that when some of the birds reached the top of the chimney, with their wings fully spread, they appeared to spring up about a foot or two out of its mouth, and then drop down one or two feet along its side before rising again above the chimney and flying away. The reason for dropping down along the side of the chimney was probably to take advantage of an upward current that was there, caused by the air striking the sides of the chimney. Some of the swifts, however, came out without springing into the air, merely dropping over the edge and down the side a foot or two, whereupon, as the strong upward current would get underneath their fully spread wings, they would take off.

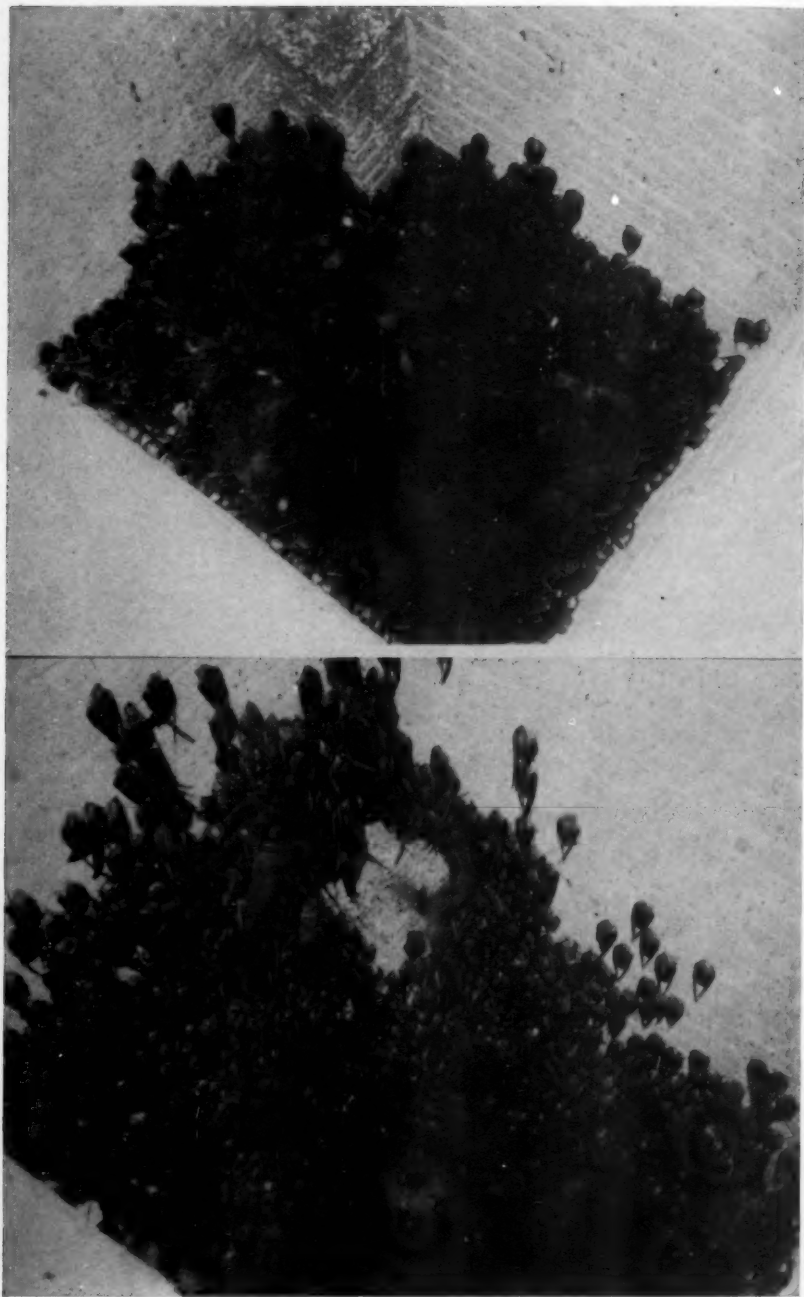
It is stated in the literature that Chimney Swifts make a very loud noise inside the chimney or tree when they depart in the morning.

Forbush (1925) quotes C. J. Maynard, who states that "when ascending, the wings are vibrated rapidly, causing a noise which resembles distant thunder." Audubon (1840), while observing swifts leaving a hollow tree in the morning, writes: "I listened in amazement to the noise within, which I could compare to nothing else than the sound of a large wheel revolving under a powerful stream." Howell (1932) states: "The noise produced as they enter or leave the chimney resembles a rumbling of distant thunder."

During several of the early morning observations, when everything was very quiet and none of the usual activities of the day had yet started, I took a position on the ground beside the chimney, just below an open ten-inch-square vent that was covered with wire mesh, and listened for the noise that is said to be made by the birds when leaving. Although I listened for periods of fifteen to twenty minutes while the birds were departing, I failed to hear any loud noise coming from inside the chimney, and could hear only the twittering notes of the birds as they left. Charles E. Mohr, Educational Director of the Academy of Natural Sciences of Philadelphia, was on the roof of the building at the mouth of the chimney on five evenings, taking flashlight photographs during the peak of the roosting period, when the birds were entering the chimney in large numbers, and he informs me that he heard no very loud sounds of any kind; the only audible sounds were the twittering notes of the birds and a low noise of vibrating wings as the birds settled in the chimney.

It is difficult to understand how a very loud noise, such as the "rumbling of distant thunder," could possibly be made with the vibrating wings of the comparatively small number of birds that would be able to ascend in the limited inside flying space of even a large chimney or tree. This flying space is often still further reduced by the many swifts still clinging to the walls while the others are leaving.

Another point to be considered in connection with the number of birds that could ascend at the same time in the chimney is the size and position of the swift's wings. Sutton (1928), after having made a very careful study of the flight of this bird, states: "The Chimney Swift's wing has no intermediate half spread position. . . . It has but two normal positions; one, folded at rest, the other, open for flight, whether that flight be rapid forward flapping, soaring, coasting, or even sudden descent." Therefore, it is necessary to keep in mind that when the swifts are ascending to the mouth of the chimney, their wings are fully spread, and since this swift's wing-spread averages over twelve inches, each ascending bird requires a considerable amount of flying space which limits the number of birds that may ascend at the same time.



CHIMNEY SWIFTS INSIDE ROOSTING CHIMNEY AT ARDMORE, PENNSYLVANIA.
(Photographs by Charles E. Mohr.)

This limitation makes it highly improbable that they could produce a very loud noise with their vibrating wings.

In view of the limited amount of published information, regarding the departure of Chimney Swifts in the morning from their roosting places, it would seem to be of interest to give a detailed account of three morning observations, together with several other brief ones.

August 28, 1944

Observation 6:45-7:35 A. M., E. W. T. Sky clear, temperature 52° F.
(5,800 swifts entered chimney the previous evening)

At 6:45 A. M., when observation started, the swifts were already leaving the chimney. They were coming out in small numbers, two, three and four at a time. Most of these remained in the air close to the chimney and when the flock reached twenty or more, they circled a number of times and flew off in a northwesterly direction. Often, while circling, several swifts would drop back into the chimney. After the sun came up, the swifts coming out would fly off directly without circling. William E. Somers, Jr., informed me that he saw the swifts still coming out at 9:30 A. M. At 10 A. M. I saw a flock of thirty circling the chimney a few times and then flying off in a westerly direction.

September 1, 1944

Observation 5:40-7:35 A. M., E. W. T. Sky partly overcast.
Temperature 74° F.

(7,160 swifts entered chimney the previous evening)

Arrived at the chimney at 5:40 A. M., moonlight. No swifts were leaving the chimney. At 6:02 A. M. one swift left the chimney. At 6:08 four swifts left chimney. At 6:09-6:12 small flocks of three to ten were leaving the chimney and flying off immediately. At 6:13-6:15 more than 100 birds came out, circled the chimney several times, and then flew off. At 6:16-6:20 swifts were coming out rapidly at the rate of 200 per minute, timed by my watch. At 6:21-6:25, a very heavy mist in the air, and dozens of birds were returning and circling the chimney and dropping back into it. At 6:26-6:30 about 50 swifts left the chimney and flew off without circling. At 6:31-6:35 several hundred came out, circled several times, and all flew off except about a dozen birds that went back into the chimney. At 6:36-7:35 still a heavy mist in the air; my clothes were damp. No swifts came out of the chimney for almost an hour. In the meantime, several hundreds of birds returned, circled the chimney and went back into it. They dropped in at the rate of five to ten per second. Made another observation 8:15-10:10 A. M. No swifts were seen in the air or leaving chimney.

September 3, 1944

Observations 5:40-8:30 A. M. and 9:30-10:20 A. M., E. W. T.
Sky clear. Temperature 66° F. at 5:40 A. M.
(6,700 swifts entered chimney previous evening)

Arrived at chimney at 5:40 A. M., full moon. No swifts were leaving the chimney. At 6:14 A. M., daybreak, the swifts started leaving chimney. They came out two and three at a time every few seconds. At 6:16-6:20 they came out two to eight at a time, flying off without circling. At 6:21-6:25 swifts came out more rapidly at the rate of about 100 per minute, soon increased to 200 per minute. Up to this time, all

swifts leaving the chimney flew off immediately without circling. At 6:26-6:35 swifts were still leaving in considerable numbers. Many then started circling and about 20 birds left the circle and dropped back into the chimney. At 6:35-6:45 large numbers of swifts were returning and joining the circle, and about 250 birds from the circle went back into the chimney. At 6:46-6:51 the sun was shining on the upper part of the chimney, and more than 200 swifts were still circling. No swifts came up out of the chimney since 6:35. At 6:52-7:30 several hundred additional swifts arrived and joined the others circling the chimney, and about 50 birds from the circle dropped back into the chimney. At 7:31-7:46 all swifts in the circle flew off in a westerly direction. At 7:47-8:30 the temperature was 72° F. Sky clear. During this period no swifts came out of the chimney, and none returned, nor were in the air. At 9:30 still no swifts came out of the chimney, or were in the air. At 10:20 the swifts again left the chimney at the rate of two to three per second.

Short morning observations were as follows:

September 4, 1944—At 9:15 A. M. Wartime. Sky clear. Temperature 72° F. Small flocks of swifts were leaving chimney, with several dropping back into the chimney.

September 5, 1944—11:40 A. M. Sky clear. Temperature 72° F. Swifts coming out of chimney in a steady stream at the rate of about five per second.

September 18, 1944—9:15-9:26 A. M. Sky heavily overcast with intermittent rain. Temperature 66° F. Several hundred birds circling the chimney with a few dropping back into the chimney. At 9:57-10:20 swifts leaving the chimney at the rate of ten per second. At 10:22-10:45 counted more than 1,000 swifts that dropped back into the chimney during this period. Late in the afternoon, I was informed that the swifts continued to circle and re-enter the chimney at different times throughout the entire day.

September 20, 1944—9:10 A. M. Sky overcast. Temperature 70° F. Swifts leaving chimney.

September 26, 1944—10:10 A. M. Sky clear. Temperature 56° F. Swifts leaving chimney at the rate of two per second.

September 29, 1944—10:15 A. M. Sky clear. Temperature 60° F. Swifts leaving chimney at the rate of five per second.

October 3, 1944—10:15-10:45 A. M. Heavy rain. Temperature 42° F. Estimated about 2,000 swifts circling chimney and a considerable number entered the chimney in the usual manner, at the rate of five to ten per second. Small flocks continuously arriving and joining the circle around the chimney.

October 4, 1944—10:30-10:45 A. M. Sky heavily overcast. Temperature 50° F. Several hundred swifts in the air close to the mouth of the chimney. Many birds entered the chimney at the rate of five to ten per second.

October 5, 1944—10:25-10:45 A. M. Sky lightly overcast. Temperature 56° F. At intervals of one to two minutes, the swifts left the chimney at the rate of two per second. They did not circle or re-enter the chimney.

From the morning observations at the Ardmore chimney, it is evident the swifts return to it soon after leaving it when the weather is unfavorable. Musselman (1926), observing Chimney Swifts at a chimney in Quincy, Illinois, states: "I discovered that on days when the thermometer indicated an approach to the freezing point, the birds

remained in the chimney until about nine o'clock in the morning. During the daytime, the birds quickly returned from their feeding over the river, circled but a time or two and dropped into the chimney until warm." The swifts at the Ardmore chimney, however, not only returned to their chimney when the weather was unfavorable, but, surprisingly, they also came back to their chimney when the weather was fair and warm.

It will be noted in the morning observation of September 3 (a clear day, temperature about 70° F.), the swifts started leaving the chimney at 6:14 in the morning and continued to do so for about twenty minutes; then they began returning and within a short time about 250 of them reentered the chimney, notwithstanding the fact that the weather was excellent and the opportunity for securing their normal food was good.

The reason for such returns of the swifts to their chimney, soon after leaving it, is unknown. Possibly such returns may be due to a group-behavior pattern, similar to the group movement we see when the birds circle the chimney in the evening before entering. I have often noted, during morning observations, that when the swifts came out of the chimney in little flocks of two and three at a time, they often remained in its immediate vicinity until a flock of 20 or more birds had gathered. Then they started circling the chimney for a number of times before flying off. These birds were acting in unison and appeared to be following a group-behavior pattern, which the birds may also be doing when they return to a chimney soon after leaving it in fair weather.

During several evening observations at Ardmore, while Charles E. Mohr was taking flashlight photographs close to the mouth of the chimney, it was noted that neither the presence of the photographer nor the sudden flashes of light produced by the bulbs interrupted the flow of swifts entering the chimney. It is said that the Chimney Swift, spending most of its daylight hours in the air and seldom, if ever, coming in contact with man, does not fear the human being. Banders who have handled these birds report them as being unusually tame. Constance and E. A. Everett (1927), who have banded swifts, state: "When removed from the cage, these swifts were very quiet and apparently comfortable at all stages of the game. When held in the hands, they would snuggle between the fingers confidently; and when held against the clothes, they would wriggle under the folds of the garments and contentedly go to sleep."

One evening, while the swifts were entering the chimney at Ardmore, one of the birds was captured and banded without displaying the

slightest fear or disturbance, and as an experiment to check the tameness of the bird, it was placed on the lapel of my coat where it remained while a flashlight photograph was taken of it. Even the sudden flash of light within two feet did not alarm the bird in the least. The swift continued to cling to the coat for twenty minutes, and it seemed so contented that it was necessary to pull the bird off to get it back into the air. During the entire performance, the swift showed no evidence of fright or excitement by any utterance or behavior.

I am indebted to Charles E. Mohr for taking the photographs and for the use of the same; to the Academy of Natural Sciences of Philadelphia for the use of its library; and to William E. Somers, Jr., and Mrs. Quintin Kramer for assistance in making the observations and counts.

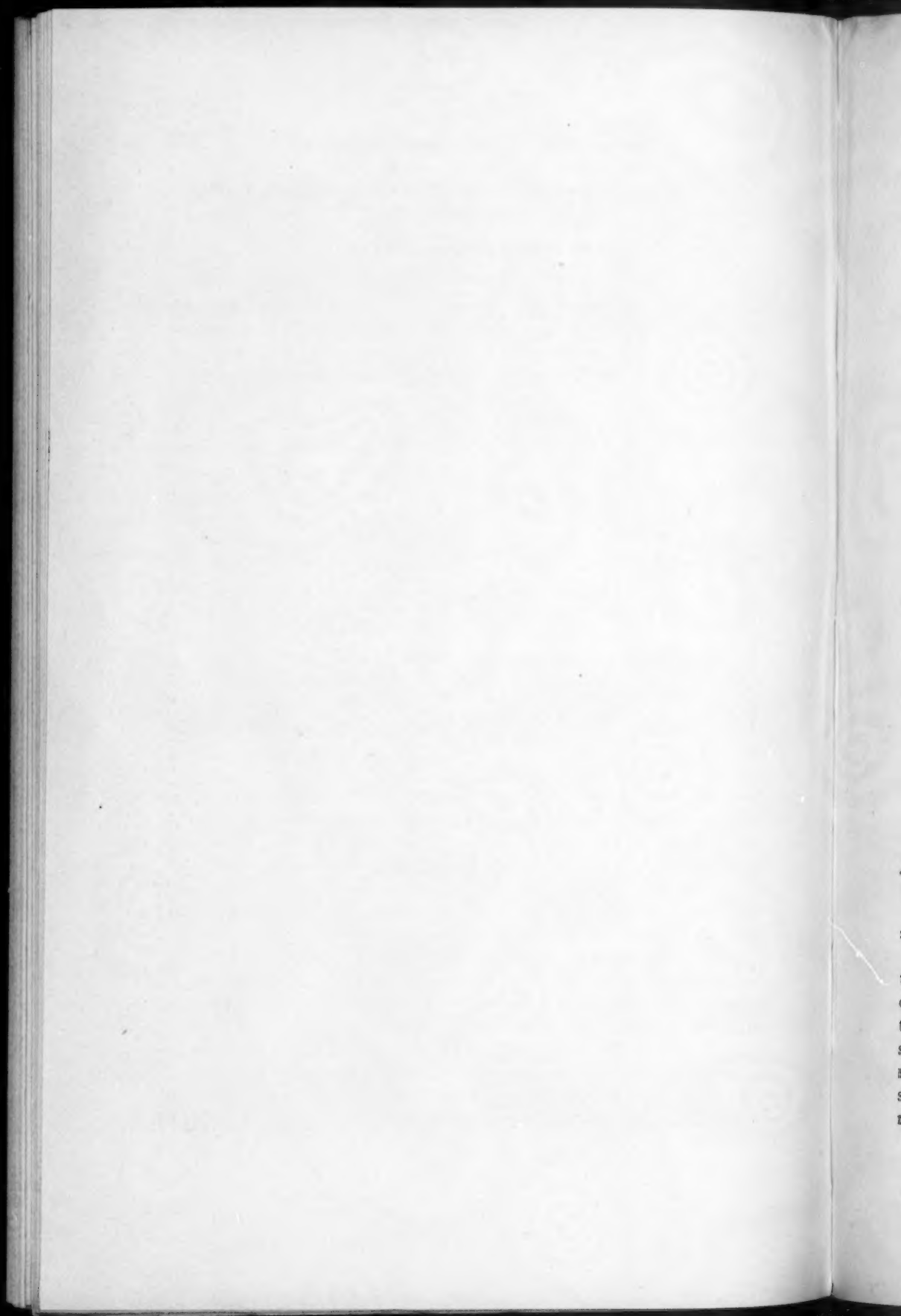
LITERATURE CITED

- AUDUBON, JOHN JAMES
1840. *The Birds of America*, 1.
BENT, ARTHUR CLEVELAND
1940. Life Histories of North American cuckoos, goatsuckers, hummingbirds and their allies. *U. S. Nat. Mus., Bull.* 176: 279.
CAMPBELL, E. K. AND D.
1926. Roosting swifts. *Bird-Lore*, 28: 395-396.
EVERETT, CONSTANCE AND E. A.
1927. The fun of banding Chimney Swifts. *Wilson Bull.*, 39: 111-112.
FORBUSH, EDWARD HOWE
1925. Birds of Massachusetts and other New England states, 2: 314.
HOWELL, ARTHUR H.
1932. Florida bird life: 301.
LINCOLN, FREDERICK C.
1944. Chimney Swift's winter home discovered. *Auk*, 61: 604-609.
LINTON, EDWIN
1924. Chimney Swift at bedtime. *Bird-Lore*, 26: 252-253.
LOWERY, GEORGE H., JR.
1939. Vaux Swift in Louisiana. *Wilson Bull.*, 51: 200.
MUSSELMAN, THOMAS EDGAR
1926. Chimney Swift banding. *Wilson Bull.*, 38: 120-121.
PICKENS, ANDREW LEE
1935. Evening drill of Chimney Swift during the late summer. *Auk*, 52: 149-153.
SUTTON, GEORGE MIKSCH
1928. Chimney Swift. *Cardinal*, 2: 85-92.

210 Glenn Road
Ardmore
Pennsylvania



CHIMNEY SWIFTS AT ARDMORE, PENNSYLVANIA.
(Photographs by Charles E. Mohr.)



THE BIRDS OF ROCKY MOUNTAIN NATIONAL PARK, COLORADO

BY FRED MALLERY PACKARD

SEVERAL check-lists of the birds occurring in the Rocky Mountain National Park region of Colorado have been published during the past fifty years. The most complete is that by Park Naturalist H. Raymond Gregg of March, 1938, which lists all the species then recorded from the park, and presents data establishing the more important records. The purpose of the present list is to add recent records to those published by Mr. Gregg and to summarize present information upon the migrations and other avian activities. Complete data upon these observations are available either in Mr. Gregg's check-list or in the park files, so in most cases the names of the rangers, technicians and others who have contributed records are omitted. The writer was in the field almost daily between March 19, 1939, and November 20, 1940, and had abundant opportunity to obtain information upon the occurrence, relative abundance and habits of many of the species listed.

Birds were collected in the park whenever the pressure of other work permitted, but specimens of many of the most common birds have yet to be added to the park collection. Therefore, sight records of all species have been considered valid only if they are supported by specimens collected in the park, or in the Denver or Boulder regions, and if the circumstances of the observations and the competence of the observer warrant their acceptance.

The dates cited are not intended to be arbitrary. It is hoped that they will serve as a basis for future observations that will verify or correct the conclusions presented here. In most cases, the earliest and latest dates of seasonal observations have been cited; in some instances an average date based upon several years' records has been used. Whenever a definite date has been mentioned, an observation of the species concerned has been recorded for that date.

This list, like most of those preceding it, is not restricted in its scope to the exact political boundaries of the park. Many of the most interesting records have been made near Estes Park village, two miles from the park entrance, and elsewhere a short distance below the park itself. Therefore, the area included in townships three, four, five and six north, ranges seventy-three, seventy-four, seventy-five and part of seventy-six west of the sixth principal meridian constitute the park region as covered by this paper.

Most of the borders of this area are in the Upper Transition Zone,

typified by ponderosa pine on the hillside, with aspen and willow along the streams, and occasional long meadows in the glaciated valleys. The Canadian Zone is characterized principally by dense forests of lodgepole pine and aspen, covering the mountainsides from 8000 feet to 10,000 feet elevations. Above this, the Hudsonian Zone is a narrow belt of Engelmann spruce and alpine fir reaching to timberline, at 11,000 feet. The high peaks above timberline are mostly covered with vast rolling alpine meadows and arctic willows, broken by frequent talus slides and precipitous cliffs. Dividing the park almost centrally, the continental divide forms a ridgeline down the park, with the Colorado River valley extending southward on the west and the lower foothills lying eastward to the plains thirty miles distant.

Dorothy Anderson Knox's paper, *Summer Birds of the Gothic Area, Gunnison County, Colorado* (Auk, 61: 19-30, 1944), includes four photographs of alpine and subalpine (upper Hudsonian) terrain very similar to corresponding regions of Rocky Mountain National Park.

This check-list includes a total of 215 species. Twenty-eight species have been added to the list published by Mr. Gregg, and these are indicated by an asterisk (*). Six other new species are listed as hypothetical, and six species have been relegated to that status from previous lists. One bird, Sabine's Gull, has been removed entirely.

LESSER LOON (*Gavia immer elasson*).—The single record from the area is of a bird collected twenty-five years ago on Grand Lake, now preserved in the Kaufman House there.

EARED GREBE (*Colymbus nigricollis californicus*).—Occasional Eared Grebes appear briefly each spring on Mary's Lake and Lily Lake between April 20 and May 15, and they are found also at Grand Lake. There is no evidence that the species breeds within the park area, as Babcock reported. Autumn data are indefinite, but doubtless the species occurs in the park on its way south in September or October.

[WESTERN GREBE (*Aechmophorus occidentalis*).—There is no definite information of the occurrence of this species in the park. Kellogg's undated fall record is cited by Sclater; Gregg probably saw one on Mary's Lake in the spring of 1937, and another uncertain observation of one was made at Sheep Lake on April 7, 1940, by Commissioner Hackett.]

PINK-BILLED GREBE (*Podilymbus podiceps podiceps*).—Although a characteristic member of the mid-spring migration (April 2 to May 8), the little helldiver is not common in the park, and stays but a short time on the lower eastern lakes and near Grand Lake. It has not been reported above 9,000 feet. It occurs somewhat less frequently during the southward migration in October (October 6 to 22).

WHITE PELICAN (*Pelecanus erythrorhynchus*).—The single record is of a bird killed at Grand Lake several years ago.

TREGANZA'S HERON (*Ardea herodias treganzai*).—This heron is found almost every spring along the streams and ponds up to 9,000 feet, but never in abundance. The spring migration is between April 3 and May 3; the fall dates are between September 13 and November 8. There are no summer records.

*BLACK-CROWNED NIGHT HERON (*Nycticorax nycticorax hoacili*).—Although not uncommon at the edge of the plains to the east, the only record is of one seen at Mary's Lake, July 28, 1940.

WHITE-FACED GLOSSY IBIS (*Plegadis guarauna*).—Gregg saw one at Mary's Lake, May 11, 1937.

[CANADA GOOSE (*Branta canadensis* subsp.).—There are no definite data to support records of this species cited in former check-lists, but probably some geese alight on ponds or on Grand Lake in migration.]

COMMON MALLARD (*Anas platyrhynchos platyrhynchos*).—Mallards return to the park as soon as the ice melts enough to give them access to open water; the arrival date varies with the season between March 12 and April 5. Resident Mallards occur almost to timberline in summer. Eggs are laid about the second week in May or later and the young leave the nests between June 5 and July 7. Small flocks gather in late summer and depart between September 25 and November 13 although a few linger until the ponds are completely covered with ice.

GADWALL (*Chauleasmus streperus*).—Gadwalls are fairly common spring migrants (March 24 to May 12), rare in fall (late October). Kellogg reported that the species bred in the park in 1890, but it is doubtful that it does so now.

BALDPATE (*Mareca americana*).—Baldpates appear to migrate customarily below the park elevations. The only record is of a pair on Mary's Lake, March 24, 1937.

AMERICAN PINTAIL (*Anas acuta tsitsiho*).—A few migrants reach the park ponds between March 12 and May 13, but they do not stay long. There are no summer records and but one fall observation, at Sheep Lake on November 1, 1934.

GREEN-WINGED TEAL (*Anas carolinensis*).—A common early spring migrant, scarcer after the middle of May. The species is reputed to nest within the park, but no actual breeding records are available. There are no fall records, but rarely a Green-winged Teal may be found on open beaver ponds in winter.

BLUE-WINGED TEAL (*Anas discors*).—Blue-winged Teals arrive in the park later than most of the other ducks, and for a time are not uncommon on the eastern ponds, but most of them linger only a day or so. There are no breeding records. They return in moderate numbers between September 12 and October 8.

CINNAMON TEAL (*Anas cyanoptera cyanoptera*).—Found in small numbers on the eastern lakes in late April.

SHOVELLER (*Spatula clypeata*).—Shovellers are fairly common in spring migration, arriving in mid-April, and a few breed up to 9,000 feet (June 29, 1939). There are no autumn records.

REDHEAD (*Nyroca americana*).—Redheads are uncommon spring migrants between March 20 and April 14. They are somewhat more numerous in fall between October 26 and November 8.

*RING-NECKED DUCK (*Nyroca collaris*).—Small numbers of Ring-necks migrate through the lower mountains between April 16 and May 12, but there are no fall records, although the species is not uncommon in autumn in the Denver region.

CANVAS-BACK (*Nyroca valisneria*).—A male was observed at Mary's Lake on October 22, 1936.

*[GREATER SCAUP DUCK (*Nyroca marila nearctica*).—Field observations indicate that a few Greater Scaups visit the eastern ponds in mid-April with the abundant Lesser Scaups. In the absence of collected specimens, however, the species must be considered hypothetical.]

LESSER SCAUP DUCK (*Nyroca affinis*).—By March 23, when the ice is melting from the lower lakes, scaups begin to arrive, and the migration continues until May 18.

There are no summer records and the autumn migration occurs after ice has formed on the mountain lakes, so that few scaups occur in the park in fall.

***AMERICAN GOLDEN-EYE** (*Glaucionetta clangula americana*).—A single drake was observed on Grand Lake, May 10, 1940.

BARROW'S GOLDEN-EYE (*Glaucionetta islandica*).—Former check-lists include this species as occasional and possibly a summer resident. Careful watch during 1939 and 1940 failed to discover it then. The only definite record is of a pair on Mary's Lake, November 4, 1936.

***BUFFLEHEAD** (*Charitonetta albeola*).—This species has been recorded twice, one on Mary's Lake, April 15, 1940, and two drakes with a duck on the fish pond in front of the National Park headquarters, May 2, 1940.

WHITE-WINGED SCOTER (*Melanitta fusca deglandi*).—There is one sight record of this species made at Grand Lake during the fall of 1937 by R. J. Niedrach.

RUDDY DUCK (*Erismatura jamaicensis rubida*).—The few Ruddy Ducks that migrate to the altitudes of the park region arrive about April 14, two weeks later than their fellows appear along the edge of the plains, and they remain but a few days. Autumn brings a small number to the park in late October.

***HOODED MERGANSER** (*Lophodytes cucullatus*).—Two mated pairs were observed on Mary's Lake, April 25, 1939.

AMERICAN MERGANSER (*Mergus merganser americanus*).—This species is a regular spring migrant (mid-April to May 14), but does not remain long in the vicinity. There are no fall records.

***RED-BREASTED MERGANSER** (*Mergus serrator*).—This species migrates in small numbers into the park during April and May. There are no fall records.

WESTERN TURKEY VULTURE (*Cathartes aura teter*).—Vultures migrate irregularly to the park between April 20 and May 23, and it is possible that they nest there. In August, an occasional vulture migrates with the hawks down Forest Canyon at a height of at least 12,000 feet. Winter records are questionable.

EASTERN GOSHAWK (*Accipiter gentilis atricapillus*).—A few pairs of Goshawks inhabit the park, apparently being more common in the Colorado River valley than elsewhere.

SHARP-SHINNED HAWK (*Accipiter striatus velox*).—There is but one spring record of this species, a Sharp-shin having been observed at Deer Ridge, March 20, 1939. Babcock reported these hawks as rare in summer, but no definite data are available. Between September 20 and October 27 moderate numbers migrate along the ranges at altitudes between 8,000 feet and 11,000 feet.

COOPER'S HAWK (*Accipiter cooperii*).—Cooper's Hawks migrate through the lower zones of the park in small numbers in late April and early May; a very few remain through the summer. There is but one fall record, September, 1939, at Horseshoe Park.

WESTERN RED-TAILED HAWK (*Buteo jamaicensis calurus*).—The most numerous of the resident hawks, Red-tails arrive in late March and early April, nest in May in ponderosa pines or on cliffs in the Transition Zone and less frequently to timberline, and the young begin to leave the nests in early June. Most of these birds disappear in July and August, but others, probably migrants, may be seen in September and October. A few winter at the lower elevations.

SWAINSON'S HAWK (*Buteo swainsoni*).—The first Swainson's Hawks arrive in the park about May 9, and it is possible a pair or so may nest there. The fall flight is spectacular, and was especially so in 1939. On the morning of August 19 of that year, adults and young appeared over Specimen Mountain at about 14,000 feet, and

soared rapidly down Forest Canyon along the continental divide. For eight days thereafter, dozens of Swainson's Hawks passed down this canyon, joined by numbers of Marsh Hawks and an occasional Red-tail, Turkey Vulture, or other raptor. Fewer were observed after August 26, and the last was recorded on October 6.

AMERICAN ROUGH-LEGGED HAWK (*Buteo lagopus s. johannis*).—The first American Rough-legs arrive late in September or in October, and they may be found in small numbers until February 20. They are seldom seen above 9,000 feet, and appear to increase somewhat in February.

FERRUGINOUS ROUGH-LEG (*Buteo regalis*).—These hawks are infrequently seen below 9,000 feet in summer, and former observers list them as breeding here, but there is no definite evidence that they have done so in recent years.

GOLDEN EAGLE (*Aquila chrysaetos canadensis*).—Few nests of the Golden Eagle have actually been found within the park, but it is believed that about five pairs nest here. An empty nest was discovered at 9,500 feet on the Needles, June 7, 1939. A pair of eagles was seen in Wild Basin, another pair near Mount Ida, and other eagles are occasionally observed at various places in the park. Their principal food appears to be the marmot.

SOUTHERN BALD EAGLE (*Haliaeetus leucocephalus leucocephalus*).—The Bald Eagle is an uncommon winter resident on the plains near the foothills, and it may be expected to occur as a rare visitor to the park between October and April. The only definite data available are of an adult near Camp Olympus on November 4, 1939; one over Storm Pass, October 1, 1940; and another over Bighorn Mountain, March 31, 1940. An interesting legend states that eagles trapped by the Indians on Flattop Mountain many years ago were of this form rather than Golden Eagles.

MARSH HAWK (*Circus cyaneus hudsonius*).—Marsh Hawks are seldom seen in spring, and are not known to nest in the park. In late summer, however, many appear above timberline, especially at Fall River Pass, where they may be seen foraging for grasshoppers and swooping at conies. This vertical movement occurs between August 1 and September 15, after which date few Marsh Hawks are to be found at the high altitudes. The true fall migration occurs between October 1 and October 18, and most of the migrant birds fly at lower elevations.

OSPREY (*Pandion haliaetus carolinensis*).—Ospreys migrate across the park during the last half of April. The data available would indicate that they may not occur here every year, but it is possible that they do. Old residents say that fish hawks formerly nested in the park, but it is not certain that they did. A bird seen on June 9, 1938, was probably a late migrant, not a resident.

***PRAIRIE FALCON** (*Falco mexicanus*).—A few pairs of Prairie Falcons summer in the park, and on June 7, 1939, a nest was found on Needles Ridge at 9500 feet. A pair was seen on Specimen Mountain on June 14, 1939, at 12,000 feet, but no nest was found there. A number of these hawks were seen during August, 1939, above timberline on Trail Ridge, indicating a vertical movement of birds that had nested at lower elevations. The latest date recorded is October 10, 1940, at Sheep Lake.

DUCK HAWK (*Falco peregrinus anatum*).—Duck Hawks migrate northward through the park between March 24 and April 27. No breeding records have yet been obtained in the state, but the species may nest in our mountains. The fall migration is early, between July 31 and September 12. Duck Hawks have been seen at various elevations in the park between 8,000 feet and 12,100 feet.

PIGEON HAWK (*Falco columbarius richardsoni*).—Pigeon Hawks have been seen at a number of places in all the life zones of the park. They are usually seen darting through the conifers closer to the ground than the other forest hawks. Their especial

prey appears to be the pipit, which they pursue along the shores of the lower lakes and over the alpine meadows.

EASTERN SPARROW HAWK (*Falco sparverius sparverius*).—Sparrow Hawks are not nearly as common in the park as they are along the foothills, but a few pairs nest below 8,200 feet on the eastern edge of the park. They arrive here the middle of April; mating has been observed on May 4; eggs have been found in a nest on June 26, while the young leave the nests about July 20. A number of Sparrow Hawks range into the park to timberline in late summer, but these have left by November. Two records, November 22, 1930, and December 26, 1932, probably refer to wintering individuals.

DUSKY GROUSE (*Dendragapus obscurus obscurus*).—Reported to be less common at lower elevations than formerly, resident pairs of Dusky Grouse are scattered throughout the park between 8,000 feet and timberline. They nest in May under the lodgepole pines on top of the moraines in the Canadian Zone, and higher. A female with five active chicks was seen at 8,200 feet on July 10, 1940, the same day ptarmigan chicks at about the same stage of development were found at 12,000 feet on Mount Chapin. Fledged young were flushed near Bear Lake, 9,000 feet, on July 25, 1940. There are reports of the presence of this species on the moraines in midwinter, indicating that there is little or no migratory movement here.

GRAY RUFFED GROUSE (*Bonasa umbelloides umbelloides*).—Estes Park is near the southern limit of this species' range, and there is but one breeding record; Cooke saw adults with young at 9,000 feet on the South Fork on August 12, 1899. There are no recent records, and since the species was always rare in this vicinity, it may be presumed that it no longer exists here.

SOUTHERN WHITE-TAILED PTARMIGAN (*Lagopus leucurus altipetens*).—Ptarmigan spend the entire year on the vast alpine meadows of the mountain tops, even in winter seldom descending much below the timberline spruces for shelter. Occasionally severe snows may drive a few as low as 7,500 feet. They assemble in small flocks in September to spend the winter together, separating in pairs in May and June when courtship cackles may be heard on every peak. They are very tame at this season, but once they begin to nest they become wary. The precocial young are guarded by the female during the first weeks of active life. The species is believed to be increasing here.

***SAGE HEN** (*Centrocercus urophasianus*).—A few Sage Hens live in the sagebrush basin a few miles south of the park, but the only record of their occurrence within the park area is of a flock of twenty-three that were seen in the Colorado River valley at 9,000 feet on November 25, 1939.

EASTERN BOB-WHITE (*Colinus virginianus virginianus*).—It is not certain whether the quail reported to be in this vicinity during the last century were native or introduced. They occurred at the eastern boundary of the park, for Widmann reports them at 8,100 feet in the summer of 1910. None have been seen since that year, and the colony probably died out.

RING-NECKED PHEASANT (*Phasianus colchicus torquatus*).—Pheasants are not common in the park, and have been recorded principally from the eastern edge below 9,000 feet, although there is one record from the Colorado River valley. Most of the reports have been obtained in April, but occasionally birds are seen in summer. They breed here, young having been found at 7,700 feet on September 1, 1936. There are reports of occasional pheasants wintering near occupied cabins up to 7,800 feet, but it appears that most of the few pheasants that summer here move lower in winter.

*[CRANE (*Grus canadensis canadensis* or *G. c. tabida*).—Old residents report that cranes occurred in numbers along the Colorado River at the turn of the century, and there are indications that they have been seen in Horseshoe Park in more recent years. There are no definite records in the files. A few cranes may be seen in migration beside ponds near Loveland and Fort Collins, and an occasional visitor to the park may be expected.]

*VIRGINIA RAIL (*Rallus limicola limicola*).—A bird collected October 5, 1938, in the swamp at 8,200 feet on Mill Creek provided the first record of this species in the park. Additional observations discovered it at Lily Lake, Hidden Valley, Endovalley and Sheep Lake, and it probably occurs elsewhere. Several Virginia Rails have been heard in summer, which suggests that the species may nest within the eastern boundary of the park up to 9,000 feet.

SORA (*Porzana carolina*).—Soras can be heard calling in the marshes at Endovalley, Sheep Lake, Lily Lake and many other places frequently after May 1. They breed regularly in those places, but the only nest yet discovered was found at 9,000 feet in the Colorado River valley on June 23, 1939. Soras range higher than Virginia Rails; one was observed on June 4, 1940, at Poudre Lakes, 10,760 feet. The latest definite record is dated August 26.

AMERICAN COOT (*Fulica americana americana*).—Migrant Coots appear on our eastern lakes between April 9 and May 20, but stay only a short time. The single nesting record is of a pair that raised four young at Lily Lake (9,000 feet) in 1939. These young left the nest on August 25. Fall records are few; the only definite date is October 22, 1936.

*FLORIDA GALLINULE (*Gallinula chloropus cachinnans*).—The Florida Gallinule is a casual visitor to Colorado. On August 8, 1939, two were seen on Lily Lake, and on the 25th, direct comparison with the resident Coots there was possible, thus verifying the identification.

SEMPALMATED PLOVER (*Charadrius hiaticula semipalmatus*).—The only report of this species is of a bird near Grand Lake in the 1870's. (See Gregg, p. 18.)

KILLDEER (*Charadrius vociferus vociferus*).—Killdeers are not as abundant in the mountains as they are near the foothills, but they migrate in moderate numbers along the lower ponds and streams of the park between March 24 and May 28; rarely, they reach timberline during migration. They are less common in summer, but may be found in suitable meadows up to 8,800 feet, and probably nest here. The fall migration takes place in early October; the latest record is October 14.

WILSON'S SNIFE (*Capella delicata*).—Little flocks of snipe migrate through the park between April 17 and the middle of May, resting briefly in sloughs near beaver ponds up to 9,000 feet. They are courting when they arrive, and their winnowing may be heard every suitable night from April 17 until early June, and occasionally into July. They breed here in June, and may be flushed from swamps through the summer. They leave for the south in September and early October. A very few have been known to spend the winter within the area.

SPOTTED SANDPIPER (*Actitis macularia*).—These little waders arrive in the park between April 25 and May 8, and for several weeks numbers may be found along the streams and ponds, especially at Lily Lake where mud flats provide an abundance of their food. The migration appears to be over by June, but before then pairs have mated or are courting. They nest in June from the lower edges of the park to timberline, possibly higher.

WESTERN SOLITARY SANDPIPER (*Tringa solitaria cinnamomea*).—There are reasons to believe that this species has been overlooked, although normally it does not range

as high as does the Spotted Sandpiper. The only definite report is of one at 8,500 feet on Cub Creek, September 13, 1937.

*GREATER YELLOW-LEGS (*Totanus melanoleucus*).—These shorebirds migrate commonly along the foothills and a few reach the lower ponds of the park in spring. The first record was of a female collected April 4, 1940, at Mary's Lake; five more individuals were seen there, or at Sheep Lake, during April. There are no autumn records.

*LESSER YELLOW-LEGS (*Totanus flavipes*).—The first Lesser Yellow-legs arrive in the park a few days after their larger relatives, and may be found in small flocks on the shores of the eastern lakes. The first record was of a pair at Sheep Lake and eight on the shore of Mary's Lake on April 16, 1940. Others were seen thereafter until April 30, on which date one was collected at Sheep Lake. The species migrates abundantly along the edge of the mountains with the other shorebirds, both in spring and autumn, but there are no fall records for the park.

WESTERN SANDPIPER (*Ereunetes mauri*).—The small sandpipers are very seldom seen in the park, although they migrate in thousands along the edge of the mountains thirty miles distant. A flock of eighty-eight Western Sandpipers at Sheep Lake on May 24, 1935, is the only record of the occurrence of "peep" within the park.

AVOCET (*Recurvirostra americana*).—Avocets congregate in noisy flocks on lakes thirty miles east of the park, but rarely visit the higher altitudes of our eastern ponds. There are three spring records of their occurrence here, dated between April 20 and May 5. Gregg cites a letter and photographs taken at Grand Lake twenty-five or thirty years ago as evidence that Avocets occasionally visit the western side of the park. There is a single summer record, July 31, probably representing a premigration wanderer.

WILSON'S PHALAROPE (*Steganopus tricolor*).—Wilson's Phalaropes arrive in the park between May 4 and May 8, and the migration continues until the middle of the month. The birds are spinning in courtship when they arrive, but the few that remain to nest here cease these antics by May 21. A few pairs nest in the sloughs near beaver ponds, but the only definite record is of three nests with eggs and nestlings found in the Colorado River valley at 9,000 feet on June 24, 1939.

[RING-BILLED GULL (*Larus delawarensis*).—A few gulls are seen at Grand Lake almost every year, but no one familiar with the various gulls that have been recorded from the vicinity of the park has studied them to determine what they are. Nie-drach believes they are probably Ring-billed Gulls. Gulls are not uncommon near the foothills, and records from the eastern side of the park are to be expected.]

*BLACK TERN (*Chlidonias nigra surinamensis*).—Black Terns are not uncommon near Denver on the plains, so the occurrence of a beautiful adult at Mary's Lake on the evening of May 16, 1939, is not surprising.

BAND-TAILED PIGEON (*Columba fasciata fasciata*).—Band-tailed Pigeons are more common in the yellow-pine belt than the recorded data would indicate. A band of at least fourteen visited Sheep Lake daily during the spring of 1940; pairs and small flocks were seen in many parts of the park, usually below 9,000 feet, but occasionally to timberline. The nest of this species has not been recorded from Colorado, and in spite of careful search none was discovered in the park; it is almost certain that they do nest here, however, and the nests should be located. The first Band-tailed Pigeons arrived on May 15, and the species had departed by September. Formerly, they were more abundant here than they are today, occurring in large flocks to 9,000 feet.

WESTERN MOURNING DOVE (*Zenaidura macroura marginella*).—Mourning Doves arrive at the park boundaries about April 30, and some pairs may be found through-

out the aspens and yellow pines up to 8,500 feet. Eggs have been found in nests between June 1 and 30. Doves are not nearly so common here as in Denver, but in late summer a number of vagrants visit the park, occurring as high as timberline. They leave in late September, with the latest record on September 29.

*YELLOW-BILLED CUCKOO (*Coccyzus americanus americanus*).—Yellow-billed Cuckoos are rare summer residents in the Denver region, and probably seldom range into the Transition Zone. A cuckoo of this species was observed at 7,700 feet near Twin Sisters Mountain on July 31, 1940.

ROCKY MOUNTAIN SCREECH OWL (*Otus asio maxwelliae*).—Screech Owls are less common in the park than in the Sonoran Zone, but may occasionally be heard here up to 9,000 feet in the aspens, yellow pines and lodgepoles. They are probably permanent residents, but no nests have been found.

FLAMMULATED SCREECH OWL (*Otus flammeolus flammeolus*).—The Flammulated Screech Owl is the rarest owl in the state, but a number inhabit the park. This species replaces the Rocky Mountain Screech Owl in the higher elevations and breeding records have been established between 8,000 and 10,000 feet. Nesting dates are June 15 and June 18.

MONTANA GREAT HORNED OWL (*Bubo virginianus occidentalis*).—On clear nights the soft hooting of the Horned Owl may be heard in nearly every section of the park; probably it has thrived under the protection it receives here. One beautifully constructed nest has been built on the lower limb of a ponderosa pine at Sheep Lake, ten feet from the ground; other nests have been found to timberline.

ROCKY MOUNTAIN PYGMY OWL (*Glaucidium gnoma californicum*).—The single report of the Pygmy Owl is a nesting record established May 31, 1890, at 10,000 feet. Frequenting dense forests, this tiny owl has undoubtedly been overlooked, and probably still inhabits the park.

*SAW-WHET OWL (*Cryptoglaux acadica acadica*).—There are no sight records of the Saw-whet from within the park region, but twice its unmistakable note has been heard in Horseshoe Park, on April 19, 1939, and again on August 5, 1939. It is probably a rare resident of the park up to 9,000 feet.

*LONG-EARED OWL (*Asio otus wilsonianus*).—A young Long-eared Owl was captured at 8,800 feet in Wild Basin on August 19, 1940, near a nest in an Engelmann spruce. The characteristic scream of this owl has been heard at Lily Lake.

NUTTALL'S POORWILL (*Phalaenoptilus nuttalli nuttalli*).—Nuttall's Poorwills have been found only below 8,000 feet on Needles Ridge at the eastern edge of the park, but a few breed there every year. This is an open yellow-pine habitat, with an abundance of juniper and other shrubby foliage. On June 6, 1940, a single egg was discovered on the ground beside a granite boulder.

HOWELL'S NIGHTHAWK (*Chordeiles minor howelli*).—Resident nighthawks appear in the park about a week after their fellows arrive in Denver; the arrival dates here are between June 6 and June 10. They are fairly common, scattered throughout the park to timberline, and occasionally may be seen flying high above the alpine meadows. Booming has been heard as late as July 11. As elsewhere, the fall migration is early and spectacular. Every few days between August 26 and September 10, flocks of several hundred pass across the park, flying a couple of thousand feet above the ground.

NORTHEASTERN WHITE-THROATED SWIFT (*Aëronautus saxatilis sclateri*).—These swifts arrive about May 5, and immediately begin to inspect crannies in the granite cliffs on the eastern side of the park for nesting sites. The flocks remain together until the middle of the month, then break up, with many of the birds departing for

other habitats, so that relatively few are to be seen here by June. Nests were discovered on the Needles at 10,000 feet on June 7, 1939. The latest record of their occurrence here is July 10, and there are no fall records. The species does not leave the Denver region until October.

BLACK SWIFT (*Nephoecetes niger borealis*).—Widmann's observation of this species at Glacier Meadow on July 8 and 10, 1910, when he had opportunity to compare it directly with the White-throated Swift, extended the Colorado records northward.

BROAD-TAILED HUMMINGBIRD (*Selasphorus platycercus platycercus*).—A few days after the first migrant hummingbirds appear (May 9 to 15), pairs may be seen courting and mating throughout the lower park. Especially abundant in the Transition Zone, this species is seldom seen as high as timberline. The nesting period is between June 7 and July 14. Young that had been seen being fed at Sheep Lake on July 13 had left the nest two days later. The Broad-tails leave early and the latest record is August 16, except for a surprising winter record in February, 1932.

RUFIOUS HUMMINGBIRD (*Selasphorus rufus*).—The Rufous Hummingbird nests to the northwestward of the park, and has not been recorded here in spring or during its early nesting season. The southward migration begins in midsummer, and between July 25 and September 1 numbers may be seen almost anywhere in the park. They appear to be more abundant some years than others, and to migrate especially at the higher altitudes. On August 10, 1939, at least two hundred were observed feeding on a patch of larkspur at timberline on Specimen Mountain, where their brilliant plumage contrasted beautifully with the deep blue of the flowers.

EASTERN BELTED KINGFISHER (*Megaceryle alcyon alcyon*).—The kingfishers arrive about April 15, and are not uncommon throughout May, but few stay through the summer. They are more frequently seen along the Colorado River than on the eastern side of the park, and several pairs undoubtedly nest near Grand Lake. The fall migration begins in late August, but an occasional kingfisher may be found as late as October 11. Rarely, one may visit open streams in the park in winter.

*[**BOREAL FLICKER** (*Colaptes auratus borealis*).—On April 30, 1939, a golden-shafted flicker was seen that is probably referable to this form. However, as intermediates are not uncommon in this vicinity, the inclusion of this species in the list must await the collection of a specimen.]

RED-SHAFTED FLICKER (*Colaptes cafer collaris*).—Flickers arrive about March 1, and are increasingly common during April and May. Thereafter, fewer are seen, although they nest commonly throughout the park to timberline. In 1940, courtship was first observed on April 8. Nests with eggs have been found between May 24 and June 12. The young are fledged by August 1. The fall migration occurs between September 2 and October 16, and a few birds remain at the edge of the park through the winter.

WESTERN RED-HEADED WOODPECKER (*Melanerpes erythrocephalus caurinus*).—In 1890, this woodpecker was considered a rare visitor to the park, but now a small number occur here every year. These appear mostly between May 19 and June 8, but one or two are to be seen in July and August, indicating that a few may nest here. All but one of about twenty seen in 1939 were males, possibly non-breeding birds that ventured here from the usual nesting habitat thirty miles to the eastward. They have not yet been found above 9,000 feet.

LEWIS'S WOODPECKER (*Asyndesmus lewis*).—Lewis's Woodpeckers migrate in abundance along the foothills, and nest in numbers from the plains to at least as high as 6,800 feet. A few reach the park in spring (May 14), and a pair or so may breed here occasionally, more likely south of Grand Lake than elsewhere. In August, these

gaudy birds move upward into the Canadian and Hudsonian zones, singly or in small bands, and may even be found above timberline (Fall River Pass, 12,100 feet, August 20, 1939). True fall migration is in progress by September 1; some of the birds return eastward to the foothills and plains while the rest migrate down the Colorado River valley.

*[WESTERN PILEATED WOODPECKER (*Ceophloeus pileatus picinus*). The presence of these great woodpeckers in Colorado is hypothetical. Bent questions the validity of all Colorado records to date since no specimens have been collected in the state. However, the bird is almost unmistakable, and careful observation would indicate that it may rarely enter the state. There is one doubtful report of one in the park on August 12, 1937. A number of aspens scattered through the park bear large gouges that closely resemble the scars made by these birds, but the marks could have been made by insects. The Canadian and Hudsonian regions of the park are well suited as a habitat for this species.]

RED-NAPED SAPSUCKER (*Sphyrapicus varius nuchalis*).—The first Red-naped Sapsuckers reach the park the last week in April, and by early May, pairs are courting in the aspen groves up to 9,500 feet. An interesting courtship area is at the foot of the Cub Lake trail. Nest-drilling in every stage was observed May 14, 1940, at which time this was the commonest woodpecker in the park. Drilling continues until June 8, when early clutches of eggs are already being incubated. Thereafter birds are seen less frequently to the end of August, and there are no reports of the species after September 1.

NATALIE'S SAPSUCKER (*Sphyrapicus thyroides nataliae*).—Except for its association with yellow pines instead of aspens, this sapsucker has a behavior pattern similar to that of the Red-naped Sapsucker. It arrives about April 18; the nest holes are drilled between May 11 and June 3; and eggs have been found between June 6 and 14. There are no records later than July 8, and fall records are lacking from the Denver region as well as here.

ROCKY MOUNTAIN HAIRY WOODPECKER (*Dryobates villosus monticola*).—Pairs of Hairy Woodpeckers are scattered through the forests of the park from the boundaries to timberline, and have been reported every month of the year. They nest in the middle of June. There is an evident vertical migration, and the birds are especially common between 8,000 and 9,000 feet from early September until late November. During mid-winter they are scarce, but may be found then as high as 10,000 feet.

BATCHELDER'S WOODPECKER (*Dryobates pubescens leucurus*).—Although a few Batchelder's Woodpeckers winter in the park, most of them descend below its boundaries in autumn, and return in late March. For a time thereafter they are quite common in the lower aspen groves, but scatter to nest to timberline in June.

ALPINE THREE-TOED WOODPECKER (*Picoides tridactylus dorsalis*).—Nesting in small numbers in the Hudsonian Zone, preferring dense spruce and fir forests, this woodpecker is seldom seen. Little is known of its habits, but its wanderings to lower elevations at times may reflect an erratic impulse to migrate vertically. Formerly recorded only from the western side of the park, it is now evident that it drifts into the Transition Zone of the east slope as well. It has been found near Estes Park in August, October and April.

EASTERN KINGBIRD (*Tyrannus tyrannus*).—The term "summer resident," as used by former writers, does not properly describe the occurrence of this species in the park. A small number reach the edges of the park in spring about May 11, which date coincides with their more abundant migration along the foothills. These migrants do not stay in the park more than a few days, and none were seen in early

summer after June 5 in 1939. There is no evidence that they nest within the park region, but it is possible that they do so near Grand Lake. Late in summer, after nesting is over in the foothills, a number of Eastern Kingbirds move upwards into the mountains. During the last week of August and the first weeks of September, they may be found scattered through the upper Transition Zone. These birds depart by September 8, presumably joining others of their species at lower elevations for the southward migration.

ARKANSAS KINGBIRD (*Tyrannus verticalis*).—Following much the same behavior pattern as the Eastern Kingbird, this species has been recorded in spring only on May 25, 1938. In late August a number wander into the park on both slopes, being conspicuous along the meadows and streams up to 9,000 feet. They leave for their southern range by September 10.

CASSIN'S KINGBIRD (*Tyrannus vociferans vociferans*).—Cassin's Kingbird has become less common here than it was formerly, and may now be considered a casual visitant, possibly occurring in late summer. There have been no definite records since 1890.

SAY'S PHOEBE (*Sayornis saya saya*).—It is surprising that Say's Phoebe has not appeared here in spring, for it is common along the eastern edge of the mountains in April. It occurs rarely in fall up to 8,200 feet between September 9 and October 6.

LITTLE FLYCATCHER (*Empidonax traillii brewsteri*).—This flycatcher arrives late in May and remains in the park at least into August. Definite records are scarce, owing to the difficulties of field identification, but this is probably the common *Empidonax* along the streams of the Transition Zone.

LEAST FLYCATCHER (*Empidonax minimus*).—The Chebec migrates through the Transition Zone of the eastern slope between May 18 and June 20. There is no indication that it nests here, and there are no autumn records.

HAMMOND'S FLYCATCHER (*Empidonax hammondi*).—This appears to be the common *Empidonax* of the ponderosa pines and aspens of the Transition Zone, and occurs in the lower Canadian Zone as well. It arrives in the middle of April and courtship begins in late May. Its departure occurs in early September.

WRIGHT'S FLYCATCHER (*Empidonax wrighti*).—Although this species has been stated to be more common than *hammondi*, no specimen of the Wright's Flycatcher has been collected within the park, and field identification is unreliable. A nest attributed to this form was found June 28, 1903 in Moraine Park.

WESTERN FLYCATCHER (*Empidonax difficilis difficilis*).—The dates of the spring arrival of this common flycatcher have not been recorded, but it has been found nesting around cabins up to 9,000 feet on both sides of the divide, between June 17 and July 5. Its autumn departure appears to occur in early September.

WESTERN WOOD PEWEE (*Myiarchus richardsoni richardsoni*).—Pewees arrive late, about May 29, but are soon common birds of the yellow pines and aspens of the Transition Zone. They occur less abundantly in the Hudsonian Zone. Nesting dates are between June 22 and July 6. They migrate in early September.

OLIVE-SIDED FLYCATCHER (*Nuttallornis mesoleucus*).—These flycatchers arrive about June 8, and soon pairs are scattered all over the park, especially in the Canadian and Hudsonian zones between 9,000 feet and timberline. Nesting dates are recorded between June 29 and July 5. The complete song may be heard until the end of July; thereafter, until September, it is fragmentary. They are believed to depart in September.

DESERT HORNED LARK (*Otocoris alpestris leucolaema*).—Horned Larks appear in the lower meadows in April, but soon ascend to the alpine tundra, where they nest.

A number were found above timberline on April 5, 1939, and it is possible that a few birds winter on these wind-blown meadows. The alpine nesting takes place apparently in late May and in June. Most of the larks leave this habitat by mid-August.

VIOLET-GREEN SWALLOW (*Tachycineta thalassina lepida*).—In 1940 the first Violet-green Swallows did not arrive until May 10. The park files contain records that indicate that this species normally arrives between April 14 and 23, but it is probable that such observations should be referred to the Tree Swallow, which did arrive during that period in 1940. Both species are common during migration, and resident pairs often quarrel over nesting sites. Concentrating especially along the fields and streams below 8,000 feet, this species has never been recorded in the higher mountains.

TREE SWALLOW (*Iridoprocne bicolor*).—The relative abundance of this swallow and the preceding species is not clearly understood. The first migrant Tree Swallows reached the park on April 20 (1940), and other migrants went through until late May. Resident Tree Swallows began investigating nesting sites after May 4. Not until May 10 did the first Violet-greens arrive, but in a few days they outnumbered the Tree Swallows two to one. Many of these were migrants, however, and the number of residents appeared to be about evenly balanced between the two species. Their nesting ranges coincide and both forms are found commonly to 8,500 feet. More Tree Swallows nested above the park boundary (7,800 feet) than below it, while the Violet-greens were more common between that elevation and Estes Park village. Rarely, Tree Swallows are to be seen above timberline, and it is possible that a few pairs may nest that high. No nests have been found above 8,500 feet in the park, except by Bergtold, who records them to 10,500 feet. Tree Swallows appear to be more adaptable than Violet-greens, nesting not only in hollow trees and bird boxes, but also on cliffs, in eaves and under bridges. The resident swallows begin to disappear in mid-July, with the Tree Swallows being the first to leave. Those at the higher elevations appear to move out first, and by July 20 only a few pairs with late-hatching broods are to be seen. All have left by the end of August.

ROUGH-WINGED SWALLOW (*Stelgidopteryx ruficollis serripennis*).—Six Rough-winged Swallows were observed in the spring of 1940 between May 16 and 27, up to 8,200 feet. Normally, Rough-wings nest below 6,500 feet on the east slope, but it is possible that the June, 1910, observation by Widmann refers to a pair that may have nested within the park region. One pair was seen near Fish Creek in August, 1939.

BARN SWALLOW (*Hirundo rustica erythrogaster*).—A few pairs of Barn Swallows reach Estes Park village every spring about May 18, and may be found during summer occasionally to the upper limit of the Montane Zone (9,000 feet). A nest and fledglings were found in a garage at Long's Peak Inn on July 24, 1940.

NORTHERN CLIFF SWALLOW (*Petrochelidon pyrrhonota albifrons*).—In 1940, the Cliff Swallows arrived in the park a few days later than the Barn Swallows, during the fourth week of May, although records in the park files indicate that they have arrived earlier, nesting as early as May 23. Parents were feeding young in four nests on June 17, 1939. Colonies of up to twenty pairs have been established up to 8,200 feet near Estes Park, while Cliff Swallows have been seen as high as 9,500 feet in the Colorado River valley.

ROCKY MOUNTAIN JAY (*Perisoreus canadensis capitalis*).—The Camp Robber summers in the Canadian and Hudsonian forests, occasionally ranging to 13,000 feet. Although they are abundant there, no nesting data are available. In winter, most of these jays descend to the lower edge of the Canadian and upper Transition zones

(8,000 to 9,000 feet), some to Estes Park village at 7,500 feet, while a few winter as high as timberline.

WESTERN BLUE JAY (*Cyanocitta cristata cyanoptera*).—The single record of this species from the park is of one seen with a flock of Long-crested Jays at Camp Woods, at 7,800 feet (? in 1932).

LONG-CRESTED JAY (*Cyanocitta stelleri diademata*).—Long-crested Jays are most common in the upper Transition Zone, not uncommon in the lower Canadian Zone and are seen occasionally in the Hudsonian Zone in late summer. There are no nesting data available. They winter from 9,000 feet to as low as 5,000 feet.

AMERICAN MAGPIE (*Pica pica hudsonia*).—The Magpie nests from the plains to the lower edge of the Canadian Zone. It is common, but varies in numbers from year to year. Nest construction begins about March 27, and eggs have been recorded from May 12 to 24, but doubtless are also laid earlier. Magpies are found in small flocks on the alpine tundra in September and October, but winter below 9,000 feet.

AMERICAN RAVEN (*Corvus corax sinuatus*).—Ravens are uncommon permanent residents of the park. In summer they are to be found high about the peaks, where it is probable they nest. In winter they descend to the edges of the park.

WESTERN CROW (*Corvus brachyrhynchos hesperis*).—Crows have been reported more frequently in October than at any other season, but are rarely seen even then. They have been recorded in late winter, and in spring and summer as well as in autumn. The highest elevation recorded for this species is about 10,000 feet.

PIÑON JAY (*Cyanocephalus cyanocephalus*).—The Piñon Jays are erratic, visiting the east side of the park in numbers varying from a few to flocks of hundreds. They are seen most frequently in Wild Basin, but occur also near Estes Park, in the Transition and lower Canadian zones. There are a few winter records, and the latest date in spring is May 1, 1938.

CLARK'S NUTCRACKER (*Nucifraga columbiana*).—Nutcrackers have been seen carrying nesting material at elevations as low as 7,800 feet (March 6, 1940), but no nests have yet been found within the park. It is believed that the species nests principally in the upper Canadian and Hudsonian zones. Courtship begins in January and continues into March. In summer, they are conspicuous on the tips of the timberline spruces, and have been observed flying above 13,000 feet. In winter, most of them descend to the lower edges of the park, and a few go as low as 5,000 feet.

LONG-TAILED CHICKADEE (*Parus atricapillus septentrionalis*).—These chickadees nest in the Transition Zone below 8,500 feet, and have been seen carrying nesting material between March 23 and May 14. The nests are probably in old woodpecker holes in aspens. They are not common in fall and winter, but small flocks remain over the breeding range during that season.

MOUNTAIN CHICKADEE (*Parus gambeli gambeli*).—Although these chickadees nest principally in the Transition Zone, they are to be found in summer as high as timberline, and probably nest to the limit of trees. Eggs have been found between June 3 and 14, but it is believed that the species begins nesting earlier than those records would indicate. In winter, small flocks of Mountain Chickadees wander through the forests and are fairly common.

ROCKY MOUNTAIN NUTHATCH (*Sitta carolinensis nelsoni*).—These nuthatches are usually found in the ponderosa pines of the Transition Zone, but are known to nest to timberline. Many migrate down to the plains for winter.

RED-BREASTED NUTHATCH (*Sitta canadensis*).—A few of these nuthatches visit the suet trays in Estes Park village every winter. They nest between 8,000 and 10,000 feet. The single dated record is of a nest in an aspen stub near West Creek on June 5, 1940.

BLACK-EARED NUTHATCH (*Sitta pygmaea melanotis*).—In spring and fall, small bands of Pigmy Nuthatches wander through the yellow pines, calling noisily, but they scatter during the nesting season and are seldom heard then. Nests have been found between June 5 and 18, at 8,200 feet, and it is certain that the birds nest well into the Canadian Zone. There is a vertical migration, sometimes to the plains.

ROCKY MOUNTAIN CREEPER (*Certhia familiaris montana*).—Pairs of these birds are scattered throughout the conifer forests of the park, but the principal nesting habitat is the Canadian and Hudsonian zones. Nesting dates are not known, but the mating song was heard on May 14. Between August and early October, a number descend into the Transition Zone and some reach the plains. Their upward migration is in April.

DIPPER (*Cinclus mexicanus unicolor*).—Along the streams that drop from timberline through the spruce and lodgepole forests into the ponderosas, nesting pairs of ouzels are scattered about a mile apart. After the nesting season, which occurs in the middle of June, the adults and fledglings remain at the higher altitudes until September; then most of them begin to descend into lower zones for winter. Stragglers migrate as the upper waters freeze, and some will winter in the park if the larger streams remain partly free of ice.

WESTERN HOUSE WREN (*Troglodytes aëdon parkmanii*).—House Wrens arrive in the park early in May, to become the most abundant songsters of the pines and aspens through the Transition and lower Canadian zones. They sing during the nesting season, which starts in early June; and some sing to the end of July, when most of the young of the second brood are fledged. They appear to depart early, in late August and early September, but there is one October record.

[**WESTERN WINTER WREN** (*Troglodytes hiemalis pacificus*).—Until a specimen is collected, reports of Winter Wrens in the park should be considered questionable. Cooke reported them near the park in 1896, and the writer saw two birds that appeared to be Winter Wrens at Estes Park on August 24, 1939. The park offers suitable habitat, and is close to the known breeding range of the species.]

CAÑON WREN (*Catherpes mexicanus conspersus*).—Cañon Wrens nest in small numbers on Needles Ridge up to 8,500 feet, where they may be heard through May. They are rather sedentary birds, but there is some vertical migration, as is demonstrated by the occurrence of the species in other parts of the eastern slope as high as 10,500 feet in summer and late fall, and by their scarcity in winter. A pair or so winter near the nesting sites in the park each year.

ROCK WREN (*Salpinctes obsoletus obsoletus*).—Rock Wrens arrive at the park boundaries in mid-April, and some continue their migration to timberline nesting sites. They nest in late May and June. The harsh song continues until mid-July, and occasionally it may be heard in August. A few of the birds have been seen above timberline in mid-summer. The descent from the mountains begins about August 20, and by the end of September these wrens have left the park.

*[**WESTERN MOCKINGBIRD** (*Mimus polyglottos leucopterus*).—The report of a Mockingbird at Estes Park on February 15, 1939, is so unusual a date that it is reasonable to suspect that the bird actually was a shrike.]

CATBIRD (*Dumetella carolinensis*).—May 19 is the earliest arrival date recorded for the Catbird. Two or three pairs apparently nest along the Thompson River and Fall River, up to 8,500 feet, each year. They have been reported nowhere else in the park. They depart in August, with the latest date being August 23.

WESTERN BROWN THRASHER (*Toxostoma rufum longicauda*).—The Brown Thrasher has been reported from the Estes Park region only in May, not above 9,000 feet.

*SAGE THRASHER (*Oreoscoptes montanus*).—On April 26, 1939, four Sage Thrashers were observed in and near Moraine Park at about 8,000 feet elevation. These were the only ones ever reported from the park region.

WESTERN ROBIN (*Turdus migratorius propinquus*).—A few Robins winter in the park, usually where juniper berries offer a food supply. Migrant males arrive during March, while the females and resident birds of both sexes reach the park in April and May. They nest abundantly to timberline between May 11 and July 7. They appear to be more common above 11,000 feet in late summer, and some remain near timberline after most of their fellows have left the park, September 15 to October 28. The latest alpine record is November 8.

EASTERN ROBIN (*Turdus migratorius migratorius*).—There are two acceptable sight records of the Eastern Robin in the park, both in Moraine Park at about 8,200 feet; one record is dated May 29, 1937, the other September 19, 1939.

AUDUBON'S HERMIT THRUSH (*Hylocichla guttata auduboni*).—The Hermit Thrushes arrive in the middle of May, and by the end of the month their reverberant songs ring through the lodgepole and spruce forests and along the mountain streams, to continue until the end of July. The birds nest in June and early July. Fall departure begins in late August and continues until the end of October.

*[RUSSET-BACKED THRUSH (*Hylocichla ustulata ustulata*).—In spite of the scarcity of Colorado records, it is suspected that this thrush migrates through this region. A thrush thought to be this form was seen on May 23, 1940, in Moraine Park.]

WESTERN OLIVE-BACKED THRUSH (*Hylocichla ustulata almae*).—Olive-backed Thrushes arrive early in May, and may be heard singing on the moraines and along the streams of the lodgepole forests until mid-July. Nesting dates in the upper Transition Zone are recorded between June 30 and July 5. Fall migration occurs in September.

WILLOW THRUSH (*Hylocichla fuscescens salicicola*).—The Willow Thrush is on the list on the basis of the reports of earlier writers. It has not been seen here since 1912. It may yet be a rare visitor to these altitudes.

*EASTERN BLUEBIRD (*Sialia sialis sialis*).—The only record of this species in the park area is of two males seen on September 25, 1939, at Estes Park.

CHESTNUT-BACKED BLUEBIRD (*Sialia mexicana bairdi*).—A few Chestnut-backed Bluebirds may arrive any time after February 21, but most of the migrants occur in the park in distinct waves in early April. A small number reach timberline, but most of the flight is through the ponderosa belt. The few pairs that remain to nest appear to arrive somewhat later, and occupy holes in aspens up to 8,000 feet, between June 13 and July 2. The fall migration, like that of spring, consists of spectacular waves of birds that are gone in a few days, and takes place between September 25 and October 6.

MOUNTAIN BLUEBIRD (*Sialia currucoides*).—Mountain Bluebirds begin to arrive in late February or early March, gradually increasing in numbers until they are the most prominent bird of the Transition Zone. Resident pairs begin to nest about May 8, while others are still migrating, but by the end of the month only the nesting individuals remain. They are scarce over most of the Canadian Zone, but are not uncommon at timberline, where they nest in fire-burned stubs. After the young are fledged, many visit the alpine meadows until their departure in late September and October. A few linger into November, and it is possible that an occasional bird may winter at the edge of the park.

TOWNSEND'S SOLITAIRE (*Myadestes townsendi*).—During winter a few solitaires may be found on the ridges and moraines of the Transition Zone, but the migrant

birds do not begin to arrive until the end of March. Their beautiful song may be heard from the forested hillsides to timberline during April, May and June, and rarely in July when most of the birds nest. During the fall migration, in late September and October, the song is again heard, louder and more brilliant than in spring.

WESTERN GOLDEN-CROWNED KINGLET (*Regulus satrapa olivaceus*).—A troupe of Golden-crowned Kinglets was seen at 9,000 feet on the Needles Ridge on April 15, 1940, which is the only spring record of the species yet obtained. They nested in the Hudsonian spruces on Twin Sisters Mountain in 1937, and were not uncommon in the upper Canadian Zone that year. The single fall record is of a small flock observed on Mount Chapin, August 18, 1940.

EASTERN RUBY-CROWNED KINGLET (*Regulus calendula calendula*).—Ruby-crowned Kinglets arrive suddenly late in April, filling the forests with their song until July; thereafter, the song is usually fragmentary, but may be heard until September. They nest in late June and July in the upper Canadian and Hudsonian zones, and depart quietly in September and October.

ROCKY MOUNTAIN PIPIT (*Anthus spinoletta alticola*).—Flocks of migrating pipits appear on the open meadows and at the edges of the lower lakes as soon as the frost is well out of the ground in late April; most of them move up to the alpine meadows within a few days. Storms may drive them down again, but after the nesting season begins in mid-June, they are seldom seen below timberline. The courtship flights end by early July, and the young are fledged by mid-August. Then the pipits begin to leave their tundras, descending to the lower meadows. Other migrant pipits join them during September and most of the birds have left the park by October.

BOHEMIAN WAXWING (*Bombycilla garrula pallidiceps*).—The erratic waxwings may be seen in numbers here one winter and not be reported again for years. Babcock reported them as sometimes quite common between October and April, but did not supply dates. Flocks visited the park in October and November, 1936, but none have been seen since.

NORTHWESTERN SHRIKE (*Lanius excubitor invictus*).—The few Northwestern Shrikes that have appeared in the park have been seen in late winter, between January 12 and February 7, all in Moraine Park at an elevation of 8,200 feet.

WHITE-RUMPED SHRIKE (*Lanius ludovicianus excubitorides*).—The spring and fall occurrences of the White-rumped Shrike correspond with the dates of its arrival and departure on the plains, so that birds that reach the park are probably migrants that nest farther north. Spring dates are April 26 and 27, and the fall migration occurs between October 27 and November 19, all in the Transition Zone. There are no winter records.

PLUMBEOUS VIREO (*Vireo solitarius plumbeus*).—The Plumbeous Vireo is usually found in the pines of the Transition and lower Canadian zones. It arrives in late May, nests during June, and migrates from the park between September 2 and 16. The period of song extends to the middle of July.

***RED-EYED VIREO** (*Vireo olivaceus*).—Red-eyed Vireos occur in small numbers in late May and early June in the aspens of the Transition Zone. There are no nesting data, but the species may breed here.

WESTERN WARBLING VIREO (*Vireo gilvus swainsonii*).—Warbling Vireos arrive in a wave about May 29, and the distinct migration continues for about a week. Nesting begins the second week of June, and eggs have been found until July 4. The young are fledged by August 1. There are no data on the fall migration.

***TENNESSEE WARBLER** (*Vermivora peregrina*).—This warbler is rare in Colorado, but has been collected in Boulder. A fine adult was singing in an aspen on Beaver

Creek, just within the park boundaries, on May 14, 1940, the only known occurrence of the species in the park.

***ROCKY MOUNTAIN ORANGE-CROWNED WARBLER** (*Vermivora celata orestera*).—A specimen, one of three birds seen May 2, 1940, at 8,500 feet on Wind River, was collected. There is a record made on September 11, 1931, but the identification is doubtful.

VIRGINIA'S WARBLER (*Dendroica virginiae*).—Virginia's Warblers arrive in small numbers between May 2 and May 23, frequenting alder thickets of the Transition Zone, but sometimes singing from the tops of aspens. There is a nesting record dated June 20, probably obtained during the nineteenth century.

EASTERN YELLOW WARBLER (*Dendroica aestiva aestiva*).—Only the fringes of the heavy migration of Yellow Warblers east of the park reach this region, but a considerable number of these birds do nest along the streams up to 8,500 feet. They arrive about May 8, and nest in June and July, usually in willows of the Transition Zone. The fall migration occurs in August.

***MYRTLE WARBLER** (*Dendroica coronata* subsp.).—As elsewhere, the first Myrtle Warblers precede the other warblers by several days; the earliest arrival date is April 17. The main flight is during May, when the species may be associated with Audubon's Warblers or may form exclusive flocks by itself. A single bird was observed at 10,800 feet at Milner Pass on July 9, 1940. The Myrtle Warblers return on southward migration in mid-August, just before the Audubon's Warblers start to move. Re-examination of the specimens collected from this region is needed to determine to which subspecies these birds should be assigned. It is probable that they are the recently recognized Alaska Myrtle Warbler (*Dendroica coronata hooveri* McGregor).

AUDUBON'S WARBLER (*Dendroica auduboni auduboni*).—Audubon's Warblers are abundant after their arrival between April 25 and May 4 until the end of May. Many resident pairs remain scattered throughout the park, being common even at timberline. Nests have been found in June and July. The autumn migration begins in mid-August, and continues until about October 7.

TOWNSEND'S WARBLER (*Dendroica townsendi*).—Townsend's Warbler is probably an uncommon fall migrant in the park, but there is only one definite record of its occurrence: a male was seen on August 17, 1940, at 10,800 feet on Long's Peak.

GRINNELL'S WATER-THRUSH (*Seiurus noveboracensis notabilis*).—Water-thrushes probably occur every spring, but there are few definite records. These are dated between May 23 and 30, in the Transition Zone, except for one seen on July 10, 1910, near Estes Park, and one reported at Grand Lake on August 31, 1940. The species is probably not quite so rare as has been believed.

MACGILLIVRAY'S WARBLER (*Oporornis tolmiei*).—Macgillivray's Warblers arrive the last week in May, and are common in the willow and alder thickets, especially of the Transition Zone. They nest from below the boundaries of the park nearly to timberline, and nests with eggs have been found between June 15 and July 5. A pair was found at timberline on Mount Chapin on June 3, 1940.

WESTERN YELLOW-THROAT (*Geothlypis trichas occidentalis*).—Although common in the foothills, Yellow-throats are rare in the higher mountains, and there are few reports of them in the park. A surprising record was the discovery of one by Gregg at 12,000 feet on the continental divide, September 13, 1939.

***LONG-TAILED CHAT** (*Icteria virens longicauda*).—A Long-tailed Chat was seen on May 27, 1940 in the willows on Mill Creek, at 8,200 feet.

NORTHERN PILEOLATED WARBLER (*Wilsonia pusilla pileolata*).—The Pileolated

Warblers arrive the latter part of May, and many of them move to timberline by the end of the month. They nest commonly in willows between 7,500 feet and timberline, but the exact dates are not on record. They begin to leave the park in August, appearing on the plains by the middle of the month, but some remain at timberline until September.

AMERICAN REDSTART (*Setophaga ruticilla*).—Redstarts occur in small numbers not far below the park boundaries, but the only evidence of the presence of the species within the park is Babcock's statement that he saw it here at 9,000 feet.

ENGLISH SPARROW (*Passer domesticus domesticus*).—The English Sparrow was first observed within the park about 1906 and has slowly increased since. Small numbers may be found in summer through the Transition Zone near Estes Park. These birds appear to gather into a single band in winter, when they frequent the village streets.

BOBOLINK (*Dolichonyx oryzivorus*).—Bobolinks rarely wander as high as the park, but there are a few records of their occurrence here between May 25 and June 15.

WESTERN MEADOWLARK (*Sturnella neglecta*).—Meadowlarks arrive in small numbers in late March and April, a few staying to nest in the meadows of the Transition Zone. There is some suggestion of a vertical migration in the occasional occurrence of one above timberline in late summer, and a slight increase then in their numbers on the lower meadows. They leave the park by late September or early October.

***YELLOW-HEADED BLACKBIRD** (*Xanthocephalus xanthocephalus*).—Yellow-headed Blackbirds are numerous from the plains to 5,500 feet in the foothills; very uncommon above that elevation. They occur frequently in the park up to 9,000 feet in April, and a small flock was seen flying over Estes Park village on August 18, 1940.

THICK-BILLED REDWING (*Agelaius phoeniceus fortis*).—Migrant male Redwings begin to arrive between March 8 and April 10 and their migration continues into late May. The resident males and the females arrive a week or so later, and for a time territorial combats rage in the willows up to 9,000 feet. Courtship displays continue until the middle of June, by which time nesting activities are well under way. The male Redwings disappear during July, but some of the females and the young remain until mid-August.

BULLOCK'S ORIOLE (*Icterus bullockii*).—A few Bullock's Orioles have been recorded in June, all of them males. One was seen at Milner Pass, 10,800 feet, on June 9, 1940. A female was seen near Grand Lake, August 29, 1940.

RUSTY BLACKBIRD (*Euphagus carolinus*).—Rusty Blackbirds have been recorded twice in the park, each time in Moraine Park, once in October, 1936, and again on August 29, 1939.

BREWER'S BLACKBIRD (*Euphagus cyanocephalus*).—Brewer's Blackbirds arrive about May 1, and frequent the ranches up to 9,000 feet. Nests are built late in June, often on the ground. The birds form mixed flocks in late August, and begin to leave the park in September. The latest recorded date is October 30.

***BRONZED GRACKLE** (*Quiscalus versicolor*).—The Bronzed Grackle was added to the check-list on May 21, 1940, when an adult male visited Moraine Park. This is a westward extension of the range of the species, although it occurs regularly at the eastern edge of the mountains.

EASTERN COWBIRD (*Molothrus ater ater*).—The park elevations are above the usual range of the Cowbird, but there is one record of the species in Estes Park on July 3, 1910.

WESTERN TANAGER (*Piranga ludoviciana*).—Western Tanagers arrive in numbers

at the end of May, scattering over the open ponderosa forests, but seldom ranging above 8,500 feet. They nest in June and eggs have been found as late as July 4. They leave the mountains in August.

ROCKY MOUNTAIN GROSBEEK (*Hedymeles melanocephalus melanocephalus*).—These grosbeaks arrive in late May, and a few nest in the Transition Zone below 8,500 feet. Rarely, they may be seen almost as high as timberline in summer. They appear to depart by the end of August.

LAZULI BUNTING (*Passerina amoena*).—Common along the foothills, this bunting visits the park irregularly in late summer, between June 29 and August 30. The species has not yet been reported from the western side of the park.

WESTERN EVENING GROSBEEK (*Hesperiphona vespertina brooksi*).—Small flocks of Evening Grosbeaks visit here intermittently every few years. One such invasion occurred in August, 1940. A nest was found in the park by Mr. F. M. Dille at 9,000 feet on July 4, 1903.

CASSIN'S PURPLE FINCH (*Carpodacus cassinii*).—Although Cassin's Purple Finches winter in numbers in the foothills, none have been reported in the park region during that season. They arrive in the park the last week of May and ascend to 9,000 feet, and some nest in the Transition and lower Canadian zones in June and early July. They leave between September and the end of October.

COMMON HOUSE FINCH (*Carpodacus frontalis mexicanus*).—A number of House Finches reach Estes Park in summer, but they are not common, and data are scarce. It is not believed they nest here since their usual breeding range is at lower elevations.

ROCKY MOUNTAIN PINE GROSBEEK (*Pinicola enucleator montana*).—Pairs of these brilliant finches are scattered throughout the Canadian and Hudsonian conifer forests, nesting between June and August, with the young fledged by about August 13. They descend into the Transition Zone in September, when the females and young flock separately from the males. In late April they return to their higher nesting range.

HEPBURN'S ROSY FINCH (*Leucosticte tephrocotis littoralis*).—The Hepburn's Rosy Finch is second in abundance to the Gray-crowned in the large mixed flocks seen between October 27 and April 29 below 9,000 feet.

GRAY-CROWNED ROSY FINCH (*Leucosticte tephrocotis tephrocotis*).—These leucostictes predominate in many of the mixed winter flocks of rosy finches, although sometimes outnumbered by the Brown-capped form. This species has been recorded between January 15 and May 12, below 9,000 feet.

***BLACK ROSY FINCH** (*Leucosticte atrata*).—These birds are rare, but occasionally one or two are to be seen in the wintering flocks. They have been recorded in November and February up to 8,200 feet.

BROWN-CAPPED ROSY FINCH (*Leucosticte australis*).—The Brown-capped Rosy Finch nests in the cliffs above timberline throughout the park in summer, and fledged young have been observed in mid-August. The birds band together in fall, descending from the alpine meadows in September or later to spend the winter mostly below 9,000 feet in the Transition Zone. Although occasional flocks may be composed almost entirely of this species, more often they include other wintering rosy finches. These flocks disintegrate by mid-April when this form ascends to its nesting range here, while the others leave the park.

COMMON REDPOLL (*Acanthis flammea flammea*).—Redpolls may be expected to occur in the high altitudes of the park in occasional winters, but no recent records are known. Former observers have included the species in their lists.

NORTHERN PINE SISKIN (*Spinus pinus pinus*).—Siskins migrate abundantly

through the park in late April and May, singing and courting about the conifers and aspens. Nests have been found up to 8,000 feet, but pairs may be encountered to timberline during the summer. Bands are formed in August, and most of the birds descend below the park for winter.

EASTERN GOLDFINCH (*Spinus tristis tristis*).—Goldfinches occur here in varying numbers in spring, usually late in May, up to 8,500 feet; one was collected on May 20, 1939, in Moraine Park. Two were seen on August 19, 1939, but there is no evidence that the species nests in the park.

ARKANSAS GOLDFINCH (*Spinus psaltria psaltria*).—A single spring record of this bird is dated May 19, 1932. The only other report was made by Widmann of a number at 9,000 feet in July, 1910. Although some observers have suspected that this species may occasionally nest in the park region, there are no data to support the assumption.

BENDIRE'S CROSSBILL (*Loxia curvirostra bendirei*).—The erratic wanderings of the crossbills may bring them to almost any forested part of the park at any time. They are most frequently encountered in the Canadian Zone, but have been observed between 7,500 and 10,500 feet.

WHITE-WINGED CROSSBILL (*Loxia leucoptera leucoptera*).—The only record of these finches is of a flock once seen on Flattop Mountain by Babcock.

GREEN-TAILED TOWHEE (*Oberholseria chlorura*).—Green-tailed Towhees usually arrive the middle of May, and soon may be found in the shrubs of the montane zone. Nests have been found between June 10 and 29. On August 19, 1940, a young towhee was seen at 11,500 feet on Tanima Peak. Many of the towhees leave the park in August, and few are seen after September 8.

SPURRED TOWHEE (*Pipilo maculatus montanus*).—There is one dated record of the Spurred Towhee in the park region, an observation by Gregg at 7,700 feet near Estes Park, May 8, 1937.

LARK BUNTING (*Calamospiza melanocorys*).—Lark Buntings appear to be rare but regular summer visitors, whose occurrences here probably represent an altitudinal wandering. A few flocks have been found between 9,200 and 12,300 feet in August, and one was seen on June 15, 1931, at 7,500 feet below Estes Park.

NEVADA SAVANNAH SPARROW (*Passerculus sandwichensis nevadensis*).—The Savannah Sparrows arrive early in May, and scatter over the montane meadows to nest there in June. Departure occurs in August and September.

WESTERN VESPER SPARROW (*Pooecetes gramineus confinis*).—Vesper Sparrows are common on open meadows on both sides of the park, arriving early in May. A number nest in the Transition Zone, and groups of adults with fledged young have been seen in July and August. Their departure takes place in late August, although a few are found after September 1.

***WESTERN LARK SPARROW** (*Chondestes grammacus strigatus*).—There is but a single spring record of this species dated May 17, 1938, near Estes Park. In late summer, however, considerable numbers visit the park elevations, being especially prominent up to 8,500 feet, but are to be seen rarely on the alpine meadows. The species breeds near the western boundary at Grand Lake and is a common fall migrant there.

***NORTHERN SAGE SPARROW** (*Amphispiza belli nevadensis*).—A female Northern Sage Sparrow collected March 24, 1939, in Moraine Park constituted the first record for the park, and was the second specimen to be collected on the east side of the continental divide.

SLATE-COLORED JUNCO (*Junco hyemalis hyemalis*).—A few Slate-colored Juncos

may be found in the park between November 13 and March 20 in the Transition Zone, accompanied by other migrant and wintering juncos.

SHUFELDT'S JUNCO (*Junco oreganus shufeldti*).—Shufeldt's Juncos arrive about September 25 and are usually common through the winter. Their numbers increase in early March, when migrants flock through the Transition Zone, to disappear about April 10.

[MONTANA JUNCO (*Junco oreganus montanus*).—These juncos so closely resemble the Pink-sided Juncos that no acceptable observations of them have been made. It is believed that they are frequently present in the mixed flocks that winter or migrate through the park.]

PINK-SIDED JUNCO (*Junco oreganus mearnsi*).—This species predominates in most of the winter and migrant flocks of juncos. The first arrive the middle of September, after which they migrate through the Transition Zone until late November or December. A considerable number usually remain all winter, to be joined by migrants again in April.

GRAY-HEADED JUNCO (*Junco caniceps*).—Most of the "saddle-backs" winter below the park elevations, but a number accompany the other species usually flocking here at that season. Spring migration begins in mid-April, progressing through May, principally in the Transition and Canadian zones; thereafter resident pairs may be found throughout the forests to timberline, where they nest in June and July. Newly fledged young have been seen between July 13 and August 20. Flocks gather for the fall migration in early September, and the southward movement continues until mid-November.

WESTERN TREE SPARROW (*Spizella arborea ochracea*).—Some Tree Sparrows usually spend the winter in the park region, but never in the abundance in which they occur at lower elevations. The fall migration has been recorded throughout November, but probably begins in October. Spring migration begins in early March, when the small flocks are less noticeable than those that pass through in the fall.

WESTERN CHIPPING SPARROW (*Spizella passerina arizonae*).—Flocks of migrating Chipping Sparrows arrive in late April, scattering through the yellow pines and lower lodgepoles abundantly. Many remain to nest in June and July, and fledged young appear about July 13. Mixed flocks of Chipping Sparrows, Brewer's Sparrows and Clay-colored Sparrows form early in September, and migration continues until mid-October, after which few are seen.

CLAY-COLORED SPARROW (*Spizella pallida*).—Clay-colored Sparrows are more common in the park region than has been believed, and small numbers migrate through the Transition meadows in May. No nests have been found, but males may be heard singing until late June, and young have been observed in mid-July. Fall migration begins in September.

BREWER'S SPARROW (*Spizella breweri breweri*).—Brewer's Sparrows occur in some numbers in spring and fall through the Transition Zone. A nest found in Beaver Meadow, May 18, 1937, was tentatively referred to this species, and on July 13, 1940, an adult was seen feeding two young in Moraine Park.

WHITE-CROWNED SPARROW (*Zonotrichia leucophrys leucophrys*).—Arrival dates of this species have been recorded from March 15 to May 15, but usually the White-crowned Sparrows arrive late in April. It is probable that the earlier reports should refer to Gambel's Sparrow, which usually migrates north earlier than this form. White-crowns nest abundantly at timberline, and less commonly down to the upper edge of the Transition Zone. Fall migration begins in early September and continues until October 26, the latest date recorded.

GAMBEL'S SPARROW (*Zonotrichia leucophrys gambelii*).—There are no certain spring records of this sparrow, but a number of observations of fall migrants have been made in October, when they were in company with the White-crowned Sparrows.

[FOX SPARROW (*Passerella iliaca* subsp.).—Babcock referred the single Fox Sparrow he saw at 9,000 feet in the park region, date unknown, to the Slate-colored race (*P. i. schistacea*). However, the only specimen collected from the Denver region proved to be the Eastern Fox Sparrow (*P. i. iliaca*). Fox Sparrows are rare in Colorado, and in view of the uncertainty about which form was seen here, and the lack of data, the record should be considered hypothetical.]

LINCOLN'S SPARROW (*Melospiza lincolni*).—Lincoln's Sparrows reach the lower park in mid-May, and many of them soon ascend the valleys, nesting near the streams and marshes to timberline in June. The young are fledged by the end of July or early August. Late in August they begin to descend out of the park, and few are to be found here after September 30.

MOUNTAIN SONG SPARROW (*Melospiza melodia fallax*).—Song Sparrows begin to appear in early March, and throughout April and May numbers are to be heard singing along the streams of the Transition Zone. They nest in May and June, and are inconspicuous but fairly common through the early summer. They leave the park in late summer, and the latest record is dated September 13.

THE MORE IMPORTANT LITERATURE PERTAINING TO THE BIRDS OF THE VICINITY OF ROCKY MOUNTAIN NATIONAL PARK

ALEXANDER, GORDON

1937. The Birds of Boulder County, Colorado. Univ. Colorado Studies, 24 (no. 2): 79-105.

1938. Observations on hybrid flickers in Colorado. Jour. Colorado-Wyoming Acad. Sci., 2: 29.

AMERICAN ORNITHOLOGISTS' UNION

1931. Check-List of North American Birds, Fourth Edition.

1944. Nineteenth Supplement to the American Ornithologists' Union Check-List of North American Birds. Auk, 61: 441-464.

BABCOCK, DEAN

1923. Birds and plants of Rocky Mountain National Park. (Estes Park Trail, Colorado, 20 pp.)

BABCOCK, DEAN, AND ASHTON, RUTH B.

1930. Birds and plants of Rocky Mountain National Park, with keys for their identification. (Published by the authors.)

BAILEY, ALFRED M., AND NIEDRACH, ROBERT J.

1938. Notes on Colorado geese. Auk, 55: 519-520.

BENT, A. C.

1919-1940. Life histories of North American birds. U. S. Nat. Mus. Bull., nos. 107, 113, 121, 126, 130, 135, 142, 162, 167, 170, 174, 176.

BERGTOLD, WILLIAM H.

1928. A guide to the birds of Colorado. (Smith-Brooks Printing Company, Denver, 207 pp.)

BETTS, NORMAN DEWITT

1913. Birds of Boulder County, Colorado. Univ. Colorado Studies, 10: 177-232.

CHAPMAN, FRANK

1900. The warblers of North America. (D. Appleton and Co., New York.)

COOKE, WELLS W.

1897. The birds of Colorado. Agri. Coll. of Colorado, Bull. 37 (Tech. Ser. no. 2): 1-144.
 1898. Further notes on the birds of Colorado. Agri. Coll. of Colorado, Bull. 44 (Tech. Ser. No. 4): 145-176.
 1899. More new birds for Colorado. Auk, 16: 187-188.
 1900. The birds of Colorado. Agri. Coll. of Colorado, second appendix to Bull. 37. Bull. 56 (Tech. Ser. No. 5): 147-240.
 1909. The birds of Colorado—Third supplement. Auk, 26: 400-422.
 1912. The present status of the Colorado checklist of birds. Condor, 14: 147-153.

GREGG, H. RAYMOND

1938. Birds of Rocky Mountain National Park. Rocky Mountain Nature Assoc. Publ. 4.

HENDERSON, JUNIUS

1909. An annotated list of the birds of Boulder, Colorado. Univ. Colorado Studies, 6: 219-242.

KELLOGG, V. L.

1890. Notes on some summer birds of Estes Park. Trans. Kansas Acad. Sci., 12: 86-90.

KEYSER, LEANDER S.

1902. Birds of the Rockies. (A. C. McClurg and Co., Chicago.)

KLEINSCHNITZ, F. C.

1937. Field manual of birds, Rocky Mountain National Park. (Published by the author.)

MCGREGOR, E. C.

1897. Birds of Estes Park. Nidologist, 4: 38-39.

MINOT, HENRY D.

- 1880-81. Notes on Colorado birds. Bull. Nuttall Ornith. Club, 5: 181-182 and 223-232; *op. cit.*, 6: 89.

NIEDRACH, ROBERT J., AND ROCKWELL, ROBERT B.

1939. The Birds of Denver and Mountain Parks. Colo. Mus. Nat. Hist., Popular Series no. 5: 196 pp.

PACKARD, FRED MALLERY

1939. Northern Sage Sparrow on the east slope of the Rockies in Colorado. Auk, 56: 481-482.

SCLATER, W. L.

1912. A History of the birds of Colorado. (Witherby and Co., London, 276 pp.)

WIDMANN, O.

1911. List of birds observed in Estes Park, Colorado, from June 10 to July 18, 1910. Auk, 28: 304-319.

NATURE NOTES FROM ROCKY MOUNTAIN NATIONAL PARK

- 1929-36. (Numerous citations of observations by several persons. These are listed in detail by Gregg.)

ROCKY MOUNTAIN NATIONAL PARK

- 1900-40. (Card index of observations made at Rocky Mountain National Park.)

*Passaic,**New Jersey*

UNIVERSITY OF MICHIGAN LIBRARIES



SUMMER HOME OF SWAINSON'S WARBLER ALONG THE OCMULGEE RIVER, CENTRAL
GEORGIA.

NOTES ON SWAINSON'S WARBLER IN CENTRAL GEORGIA

BY BROOKE MEANLEY

Plate 18

THE Ocmulgee River bottom of central Georgia, with its cane-fringed streams, rank undergrowth and bountiful deciduous forests, presents the ideal habitat for the breeding of Swainson's Warbler (*Limnothlypis swainsonii*). The bottomland actually begins at the Fall Line near the city of Macon, and follows the muddy Ocmulgee for many miles southward beyond the Bibb County line. The river itself eventually merges with the Oconee to form the Altamaha which enters the sea near Brunswick, Georgia.

To find Swainson's Warbler in this country, one must seek it in the vast canebrakes which are scattered along the tributaries that feed the river, or look for it about stagnant ponds where the dark woodland, with its rank growth of immature cane, greenbrier, and herbaceous plants, presents a rather perplexing picture and one that might be passed up by the ornithologist seeking a more attractive section of the woods. Cane in a mature or immature form *must* be present, and I know of no occasion when I have seen or heard this warbler on its breeding grounds that a growth of cane was not in sight.

Once its haunts are discovered the bird is not difficult to find. It stays in the midst of the canebrake or thicket, seldom coming into the open. However, its presence can easily be detected once its song or *chip* is heard. One merely has to penetrate the canebrake or work about its border to see the little brown bird which can readily be detected from the slight rustling it makes in the leaves or from its motion as it works a few feet up from the ground among the cane stalks or weed stems.

Three distinct breeding territories, varying markedly in floral type, were worked during the spring and summer of 1944. Areas No. 1 and No. 2, as they are termed below, are quite unlike the supposedly typical Swainson's Warbler breeding ground, while Area No. 3 was anticipated as a nesting type many months before the birds were first noted there.

Area No. 1, where the first bird was seen, lies along the border of the bottomland. In some respects, the woodland here approaches the eastern upland type. Large tulip trees, water oaks, sweet gums, loblolly pines and dogwood are common. Small growths of cane, some four feet high, are scattered throughout the area, becoming more concentrated along the small streams and ditches that have been dug

as a measure of controlling mosquitoes. From January until the latter part of April, most of this area was inundated. During the flooded period, on March 31, the first Swainson's Warbler of the spring season was noted.

From my notes I find that, during the last week of March, the spring woodland was at the height of its grandeur. The dogwood had been in flower for several weeks, the azalea was in full bloom and most of the trees were foliated with small leaves. In the flooded bottom, the Louisiana Water-thrush was the most vociferous of the passerine birds and had been in the magnolia swamp near-by since the second week in March. The White-eyed Vireo reached this locale only several days later. Lincoln's Sparrow was a rare migrant recently seen; and the Black and White Warbler, Yellow-throated Warbler, Bachman's Sparrow, and Blue-gray Gnatcatcher were among the new arrivals of the past two weeks. Lingering winter species were the Hermit Thrush, Ruby-crowned Kinglet, White-throated Sparrow, Palm Warbler, Yellow-bellied Sapsucker, Rusty Blackbird and Winter Wren.

The migrant Swainson's Warbler, noted on March 31, was walking about the floating debris, probing beneath the matted leaves and twigs. The bird was quite tame and kept only 15 feet ahead of me as I pursued it. The cane rushes here were very dense, and the stalks a quarter of an inch in diameter and approximately seven feet in height. However, the area was no longer a normal nesting place since that part of the woods would be dry in a few days.

A cold wave during the second week in April momentarily put a damper on migration, and it was not until the fifteenth of the month that a second Swainson's Warbler was seen. This bird was noted some 200 yards from the place where the first one was on the 31st. The immediate area, some 75 feet square, was the most fertile part of the woods, and there were more birds there than in near-by sections. It was a wet, sloping thicket with a small scattering of cane rushes, some alder, briar, poison sumac, farkleberry, small red maple, sweet gum, magnolia and cinnamon fern, with a mosquito-control ditch running along the side of it.

I was first attracted by the Swainson's sharp and distinguishable *chip* from an alder branch at the edge of the thicket. The bird did not remain in that position long but hopped to the ground where it began feeding. I had no trouble in following it closely. I usually placed myself in front of it, allowing it to work toward me, to see how close it would come. Frequently, as I lay close to the ground, it would walk up within reach, look up for a second, and simply walk around

me or fly a few feet away to resume feeding. It seemed to be annoyed rather than frightened.

During its first few days in this habitat, the bird remained on the ground most of the time, walking about like an Ovenbird, sometimes hopping in the manner of the Kentucky Warbler, as it thrust its beak unhesitatingly beneath leaves and twigs in search of ground beetles, its favorite food. Unlike the smooth maneuvering of the Ovenbird, which it more closely resembled in habits at that time of the year than any other ground warbler, it walked about rapidly, covering very little ground, with the posterior part of its body trembling and often jerking as if the bird were chilled. (In contrast, Swainson's Warblers observed in other areas often had a smooth gait.) It seldom ventured into a clearing, remaining in the thickest part of the brush in the wet places and feeding among the ferns and briar.

Until about April 22, it sang sporadically, most of the time from the ground, singing every fifteen or twenty minutes, although at times it did not sing for two hours and then had a tendency to sing only when other birds started singing. It was so wrapped up in its song that it was absolutely unconcerned as it sang at my very feet, with its head thrown back until its beak pointed perpendicularly toward the sky, and it poured forth its resounding melody in the best warbler fashion.

On the 23rd, it was the most vociferous of the warblers in that patch of woods. It sang throughout the day but was more exuberant in the early morning and after 5:00 P. M. Its singing was no more eccentric than that of the Kentucky and Hooded Warblers that were sharing the same habitat, although it has the reputation of being an unpredictable singer.

Since no other Swainson's Warblers had been noted in the vicinity, I concluded, on April 25, that the bird was a bachelor. It had returned to its old nesting territory to serenade a potential mate that was never to put in an appearance, as continued observation throughout the nesting season proved. The preceding year's nest was located in a blackberry bush the first day the warbler was observed in this habitat, and for several weeks after its arrival in this territory it continued to work most of the time within a few feet of the old nest.

I noticed that this bachelor bird had gradually extended its territory a few yards and was now singing and working over an area 80 yards in length and 50 yards wide. It sang frequently from dead branches in trees at an average height of twenty feet, yet it still spent considerable time singing from the ground. I noticed that it usually sang two or three times from one perch and then flew or walked to another near-by, continuing in song. It remained in each tree on an average of ten minutes.

On May 3, I entered the woods at 7 A. M., noting that there were many Cape May Warblers in the area, and immediately heard and saw the Swainson's Warbler singing every few seconds from the lower dead branches of a large white oak. The bird remained in that tree for some ten minutes, then flew to a near-by black gum and continued singing. In flying from one station to another it flew for longer distances than do the Hooded and Kentucky Warblers and also flew at a greater over-all height (10-20 feet).

At 7 A. M. on May 10, the bird was still singing its heart out, and on a perch fifteen feet from the ground it continued singing without a pause as I walked directly under it.

I continued to check the movements of this bird through May and June, and on June 19 it still had no mate, although it still sang vociferously. After this date I made only infrequent trips to the area. The bird was seldom heard after the first of July.

Area No. 2 was one of the most unattractive woodland types that I have ever worked. The entire area was covered with brushy cane intertwined with grape vines and greenbrier among which were strewn pieces of drift debris left behind by the spring floods. The section was cool and well shaded by a mature mixed wood, chiefly of hackberry with some ash-leaved maple, red maple, tupelo, sweet gum, swamp chestnut oak, water oak and white ash. A stagnant stream, that was slowly drying up, wound through the entanglement and emptied into a small lake. When I entered this area for the first time on May 11, several Swainson's Warblers were singing concurrently. Near the stream in the cane, I noticed three birds flying not too briskly about, chasing each other.

I felt that the birds should be nesting by this time and so began searching for nests. On the evening of May 15, not more than ten minutes after I entered the woods, I found a nest containing one egg in a cane stalk six feet from the ground. There was no incubating bird on the nest at that time, but two birds were heard *chipping* about 30 yards away. I paid especial attention to their *chip* notes and found that they somewhat resembled the sharp note of the Phoebe, varying at times to resemble the Wood Pewee, Kentucky Warbler, and Swamp Sparrow. The notes were distinctly different from those of other warblers.

A second nest, unoccupied, was discovered shortly afterwards about 200 yards from Nest No. 1. This nest also was in cane and only four feet from the ground. A male was singing 30 feet away—a habit that was consistent throughout the nesting territories.

I continued to work the area in its entirety and found that three

pairs of Swainson's Warblers inhabited it. These three pairs were the crowning glory in their environment, completely overshadowing associated species, Kentucky, Hooded and Prothonotary Warblers, Acadian Flycatcher and Cardinal, in their resounding and impressive song and the greater extent of their flight about the area.

On May 18, Nest No. 1 contained three eggs, and the female was on the nest when I approached, flushing only when my hand was one foot from her. She fluttered to the ground, scurrying along somewhat like the Kentucky Warbler, and then flew about 30 yards away. It *chipped* only two or three times, did not seem flustered or too concerned over its disturbance and made no attempt to return. A third nest was found that day. This nest, unoccupied and similarly situated, was placed about 200 yards from nests Nos. 2 and 3, so that the three nests formed the apexes of a nearly perfect equilateral triangle.

As I approached the occupied nest on May 21, I heard the male singing approximately 30 yards from the nest. I walked up to the nest and touched it before the female flew off. It still contained three eggs.

On May 27, three pairs were still present in the area and three males were singing. When one of them sang, the other two followed in close succession. The nest containing three eggs was intact, but the incubating bird was not on it and did not seem to be near-by. On the 28th, I concluded that the nest was deserted as there was still no bird about the nest and the eggs were cold. However, the male was still singing near-by.

The area was not visited again until June 19 when, accompanied by J. Fred Denton of Augusta, Georgia, I visited Nest No. 3. It contained two young birds approximately one-third grown. The male was singing near the nest. After we had partially concealed ourselves some 30 feet away, one of the birds came within a few feet of the nest, *chipped* a few times, but did not feed its offspring, apparently wary of our presence. It finally flew off, not to return so long as we remained.

Area No. 3 is, indeed, the type in which one would expect to find Swainson's Warbler. The bird was more abundant here than in any other locale visited, but due to the density of the canebrake, was more difficult to see than in Areas Nos. 1 and 2. This area marks the beginning of an almost unbroken tract of mature cane some 30 feet in height, 25 to 50 feet in breadth, that grows up to the slope of the bank of a stream which it follows for about two miles. The floor of the brake is generally bare since the solid growth of cane allows little room for herbaceous vegetation or scrub growth, and one has to seek its borders to find a diversity in plant life. However, the canebrake is enveloped by a mature forest of sweet gum, water and swamp

chestnut oak, hackberry and white ash which provides the primary covering that is a factor in blotting out the light in this typically dark and dampened woodland which exemplifies the habit of Swainson's Warbler.

In this canebrake, birds that were associated with Swainson's Warbler in the other areas studied were generally absent, and only along the border of the brake and in the tree-tops of the hardwoods the Red and White-eyed Vireos, Prothonotary, Hooded and Kentucky Warblers, Louisiana Water-thrush, Acadian Flycatcher, Wood Pewee, Blue-gray Gnatcatcher, and Cardinal were found. The absence of Spanish moss in this region accounts for the uncommonness of the Parula Warbler. Two nests of the current year were found on May 22, but neither was occupied at the time.

Nests in the three areas were examined to note their construction and composition. Most of them were similarly constructed and conformed to descriptions given by other observers. They were light but firm in build and might remind one of a combination of the nests of the Veery and Indigo Bunting. The nests were composed largely of leaves, with the bowl lined with leaf petioles, small weed stalks, rootlets and an occasional pine needle. Every nest had cane leaves in its composition, and several that were found were composed entirely of cane leaves. Other leaves used were sweet gum, elm, hornbeam, tupelo gum, and red maple. Some blackish material in the lining of most of the nests proved to be stalks of red maple fruits.

Post-nesting data.—The birds became very retiring after the breeding season, confining themselves to the darker parts of thicket and forest, and were seldom heard. For this reason they were not easy to observe. However, when located they were quite easily approached. An individual bird was heard singing in Area No. 2 on the evenings of August 10, 13, 19, and 27. On the evening of August 29, in Area No. 3, I heard my last Swainson's song of the year. These warblers in decreasing numbers were present in the bottomland until September 16, after which date I have no records of their occurrence.

During the latter part of August, when the waves of warblers were coming through its territory, the Swainson's paid little attention to the migrant *Compsothlypidae*, and only on one occasion did I see a single Swainson's associating with them. The species is individualistic; the tendency for other birds to associate with it, rather than the reverse, seemed to hold true throughout most of the summer.

Status in Ocmulgee bottom.—From this observer's experience, Swainson's Warbler was found to be a common summer resident wherever a suitable habitat prevailed in the Ocmulgee bottomland. In prac-

tically every patch of cane in which I worked, a pair of these birds or a small colony was found breeding. Once the habitat was located and an individual noted, it was a none too difficult task to find additional birds. The most definite clue to the presence of Swainson's Warbler in a suitable environment in the spring, was its distinctive song—one that stood out above that of any other member of its family.

The writer is indebted to Messrs. J. Fred Denton, H. L. Stoddard and F. M. Uhler for supplying nesting and environmental data on Swainson's Warbler.

LITERATURE CITED

BREWSTER, WILLIAM

1885. Swainson's Warbler. *Auk*, 2: 65-80.

WAYNE, A. T.

1910. Swainson's Warbler. *Birds of South Carolina*: 149-151.

Baltimore

Maryland

BARROW'S GOLDEN-EYE IN MASSACHUSETTS

BY LUDLOW GRISCOM

In a recent interesting article on the Barrow's Golden-eye in eastern North America (*Auk*, 61: 544-554, Oct., 1944), Dr. A. M. Hasbrouck amasses evidence to prove that this little-known species is by no means as rare as stated in most general works of reference. The article appears to me to be open to minor criticism in the method adopted, and the author's inevitable lack of detailed local knowledge has led him into minor geographical errors and unwitting duplication of records. Moreover it was quite impossible for him to make any general or summary statements.

It so happens that the coast of Massachusetts lies within the normal and regular winter range of the relatively small population of the Barrow's Golden-eyes of eastern North America. Twenty years of intensive modern observation by well over 100 individuals per annum gives us a picture of the status of the species in this state, which is, I think, well worth bringing out, but which, naturally enough, Dr. Hasbrouck was unable to do.

Dr. Hasbrouck states that a search of the literature and the replies to his questionnaire yielded a total of 244 records from Massachusetts. He prints only 29 of these, of which nearly one-third are accidental duplications. If the number of individuals is added up, the total is far higher than 244. While I do not know how he arrived at 244 records, or on what basis he printed what would appear to be 29 of

them only, the *actual* number of *valid* records comes to nowhere near so enormous a total. I conclude, therefore, that my definition of a "record" is quite different from Dr. Hasbrouck's.

Historically, Barrow's Golden-eye was thought to be an accidental straggler to Massachusetts until the winter of 1919, when Dr. C. W. Townsend and Francis H. Allen found a male at the Red or Sliding Rocks in Lynn Harbor, a section of park where no gun has been fired for many years. Here, at high tide, the ducks feed right off the edge of the low cliff, and the two species of Golden-eye can be watched together, often within shotgun range. Under these 'abnormal' conditions, it is possible to distinguish the females accompanying the male Barrow's as differing from the adjacent female American Golden-eyes in just those respects which are well known to constitute the external specific characters of minor importance between the two species.

After the discovery given above, a constant succession of visitors, members of the Nuttall and Essex County Ornithological Clubs, proved that a small group of Barrow's Golden-eyes spent the winter there annually. As Forbush put it (*Birds of Massachusetts*, 1: 251, 1925) from two to four males and five to twelve females were there every winter. This was generally known, and Mr. J. T. Nichols and I made a special trip to Lynn from New York in February, 1925, to see for the first time Barrow's Golden-eye alive.

The Bulletins of the Essex County Ornithological Club from 1922 to 1938 give annual details of the number of birds, and the dates of their arrival and departure, of which more later. The question of the number of 'records' now arises. If 50 observers see the same little group of birds in any given winter, and several of them make several to many visits, I submit that it all boils down to one 'record.' If six of these observers happened to fill out Dr. Hasbrouck's circular, I suspect he counted their observations as six records, thus accounting for his total of 244. Either, therefore, the number of 'records' is far less than 244 or very much greater, as the same flock of Lynn birds seen by 50 observers on two visits each would be 100 'records'! In any event, for convenience we shall designate Lynn as Locality 1. This locality began to fail in the winter of 1936-1937 when only one adult male showed up. Presumably a failure of the favorite mussel beds was the cause. Practically no birds appeared in 1937-1938, some birds occurred erratically during January 1939, and after this time this winter flock disappeared for good.

Locality 2.—Mr. S. Gilbert Emilio discovered another small flock at Mingo Beach, Beverly, also a protected park, in the winter of 1935-1936. A small flock wintered here annually for six years, and

then abandoned this locality also. The maximum number of adult males any winter was four. Conditions of observation were not so favorable, the birds were never so near shore, and it was never possible to be certain how many of the females were Barrow's.

Locality 3.—Newburyport Harbor.—Regular weekly trips throughout the winter began here in 1929. From then on to the present year, male Barrow's Golden-eyes are seen here occasionally, but I feel convinced that the species is a regular winter resident in very small numbers. There are several square miles of water, and 500–1500 American Golden-eyes are scattered over it. Two hours after high tide, a small number came to the mouth of the city sewer near the Yacht Club, where they are reasonably close to shore, and it is here and here only that occasional drake Barrow's Golden-eyes can be readily identified. Females can never be recognized.

Locality 4.—Cape Ann (Gloucester and Rockport).—American Golden-eyes are abundant on the open ocean and in the tiny coves of this rocky headland. They are wild and wary, and rush away in flight the moment the observer appears around a curve. One or more male Barrow's Golden-eyes are seen here annually, and the species is again almost certainly of regular occurrence. The conditions for observation are difficult, and the detection of females is impossible.

To sum up, all four of these localities are on the coast of northern Massachusetts, north of Boston, bathed by a notably cold ocean with a well known 'northern' marine invertebrate fauna. These conditions are actually a southern extension of those on the coast of Maine. It has been established for forty years that Barrow's Golden-eye is a common winter resident of extreme eastern Maine (Washington Co.) decreasing westward, and unrecorded off the small stretch of sandy coast-line in extreme southwestern Maine. The small number of Maine 'records' in Dr. Hasbrouck's article merely proves the much smaller number of observers, the lack of continuous observation, and the much greater coast-line.

Returning to Massachusetts, the Barrow's Golden-eye is a regular winter resident in very small numbers to that portion of the coast which is bathed by a cold ocean with a 'northern' marine fauna. It has no use for a sandy shore. South of this area it is apparently a casual straggler only. There are only three records for Cape Cod, one for Buzzard's Bay and one for Vineyard Sound, in spite of greatly increased observation in the past 20 years. The species reappears off the rocky coast of Rhode Island (where Dr. Hasbrouck's article is particularly useful in having compiled the relatively numerous recent records), and very rarely off the rocky tip of eastern Long Island

(Cruickshank, *Birds around New York City*: 112, 1942). An interesting point develops; the southward occurrence of Barrow's Golden-eye is *almost an exact parallel* with that of the King Eider!

There has been some evidence of cyclic change in Massachusetts. Peak numbers were reached in the winter of 1935-1936, when the Lynn flock was at maximum numbers, the Beverly colony was discovered, and there were "numerous records," to quote the Bulletin of the Essex County Ornithological Club, from Newburyport, Cape Ann, and elsewhere. Since then the species has been steadily declining. Since 1941 it has been reported only once or twice a year.

Little or nothing has been published on the migration of Barrow's Golden-eye. It is a very late and hardy species, exceeding in this respect its common cousin, and never lingers so late in the spring. Full numbers have never been reached earlier than late December. Eighteen years of continuous observation at Lynn yield two arrival dates in November, only five the first week in December; earliest for the state, November 11, 1936—Lynn; November 15, 1936, at Newburyport; November 16, 1913, one shot off Gloucester by Thorvald Ross and G. W. Cobb. The fall of 1936 was notable for the early arrival of winter and the very early general arrival of Golden-eyes. On the other hand, it should be noted that the earliest American Golden-eyes (mid October—early November) are always females and immature, and these plumages of Barrow's are not identifiable in life. In spring, adult males have lingered at Lynn to the last week in March in only four years, into April in five years, in particularly cold and backward seasons. This is a very different picture from the American Golden-eye, males of which are seen every May.

Readers are urged to reread Major Brooks's fine article in the Auk, 37: 356 *et seq.*, 1920 and examine the lovely plate XVI and the drawing of the skulls of the two species (figs. 1 and 2, p. 362). As Major Brooks says, the adult male can be identified as far away as any other duck, but there is no use under normal conditions in speculating on the identity of females and immatures. One character in the male he does not mention, though it is shown in Plate XVI. The crown of the American Golden-eye is peaked or subtriangular, the crown of Barrow's is *low, long, and evenly rounded*. The forehead *rises steeply*, forming a *right angle* with the line of the culmen or even a subacute angle. The forehead of the American Golden-eye always forms an obtuse angle with the line of the culmen. The frontal bulge of the skull of the adult male Barrow's Golden-eye fully accounts for this difference in outline, which is noticeable at distances where the purple gloss is invisible and the shape of the white crescent is observable with

difficulty. Every picture and colored plate of Barrow's Golden-eye in eastern books is erroneous in this respect.

Unfortunately, the tendency of modern bird-study is towards oversimplification. Since Major Brooks's article, it has become a settled tenet of faith that the adult male Barrow's Golden-eye is (1) readily identifiable and (2) that the best field character is the row of white spots on a dark wing. Proposition no. 1 is true, but proposition no. 2 is, alas, false. Most unfortunately, the male American Golden-eye occurs annually in November and December and again in April in an eclipse or transitional plumage, which has a row of white spots on a dark wing. At a distance or in poor light, the careless or inexperienced observer fails to detect that the "dark" wing is dingy grey, not jet black, and no effort is made to note the other characters, which a real adult drake Barrow's Golden-eye actually possesses. In this way an imaginary Barrow's Golden-eye is quickly materialized out of whole cloth! This has become an annual event on Fresh Pond, Cambridge. Every fall I see transitional male American Golden-eyes which, the day before, the same day or the next day, some other observer happily reports as Barrow's! I have even seen a bird with the round head spot coming in, which was only *partly in*, making it appear crescent-shaped! November, December and April sight records of Barrow's Golden-eye by inexperienced observers, in places where the species does not normally occur, should be dismissed as unworthy of scientific consideration, unless evidence is put on record to show that all the excellent characters of the beautiful drake were noted, and the species was known to arrive particularly early or remain late that year in its regular haunts. All such records from inland localities in Massachusetts are open to suspicion and require validation in my best judgement, as they are either remarkably early or remarkably late.

Cambridge

Massachusetts

AN EXAMPLE OF BUMBLEFOOT IN THE GREAT HORNED OWL

BY DAYTON STONER AND LILLIAN C. STONER

Plate 19

ON March 10, 1944, Dr. Stoner received from E. P. Hotaling, a taxidermist in Gloversville, New York, the carcass of an adult male Great Horned Owl, *Bubo v. virginianus* (Gmelin). The bird was reported to have been taken near Summit, Schoharie County, a few

days earlier. Although the owl was of about average size for this sex of the species (length, 19.75 inches; wing 15.0; tail 8.6) it was much emaciated and weighed only 2.44 pounds.

Evidently the owl had not been able to feed for some time; the usual fat areas on the body had been completely absorbed. In addition, the flesh appeared to be thoroughly dehydrated. A grayish, shell-like mixture apparently of blood, loosened feathers and possibly also nasal discharge had hardened about the external nares. Some of this material was attached in small globules to the tips of the antrorse nasal feathers. The tips of the tail-feathers were somewhat worn and broken, the vanes soiled and discolored with dried and hardened excrement. At the bend of the left wing some abrasion and slight bleeding had occurred. Evidently this was due to attempted use of the wing in terrestrial progression in an attempt to supplement the use of the incapacitated feet. The remainder of the plumage appeared to be normal and cleanly.

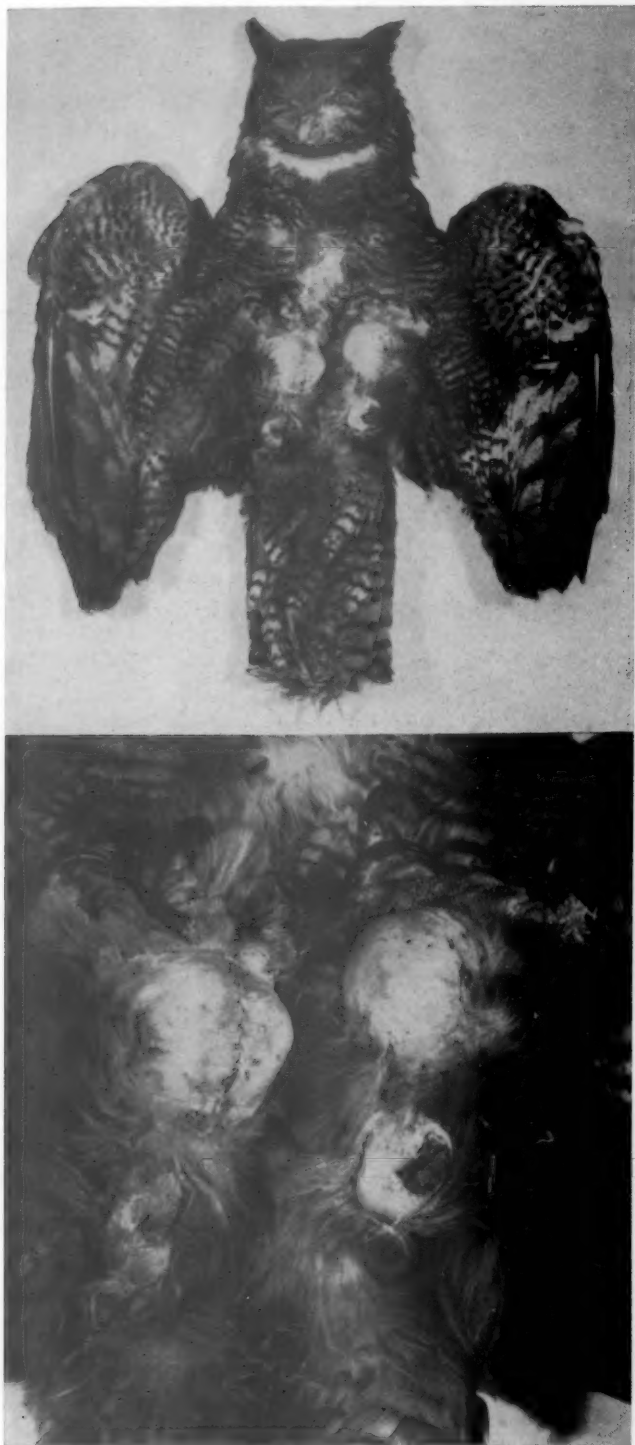
The conditions of the two enlarged and swollen feet were noted separately as their appearance was somewhat different.

The swelling on the left foot was 1.5 inches long by approximately 1.5 inches wide. While the entire foot was swollen, the largest part of the swelling was dorsal and posterior to the sole of the foot. All the claws were sound and entire except that of the third toe which consisted of a basal stub that was more or less gangrenous. Apparently this claw had been missing for some time, its tip worn from use.

The ventral side (of the left foot) of proximal end of tarso-metatarsus and tibio-tarsus had a much smaller bare, swollen area 1 inch long by 0.8 inch wide. Evidently this swollen area had previously broken open and a hard reddish brown scab had accumulated.

The right foot was somewhat less swollen but it had a tumescence dorsal and posterior to the sole of the foot slightly smaller than, but otherwise similar to, that on the left foot; extent about the same. Claw of the second toe adhering to the foot only by a shred of skin dorsally; the claw itself normal; 'gangrenous' area involving the osseous tissue at the base of toe. Dorsal side of foot less tumescent than left foot. Naked area at 'heel' less extensive and inflamed than that on the left tarsus but carrying a small brownish scab.

Mr. Hotaling, the taxidermist from whom the specimen was obtained, stated by letter that he believed the bird had been killed in the wild and from the general cleanly appearance we would assume this to be the case. He also added that the swollen condition of the feet was first noticed when he started to skin the bird and thinking that perhaps the owl had attacked a porcupine he made a cut in the enlarged part of the right foot; however, no quills were found.



BUMBLEFOOT IN THE GREAT HORNED OWL. (Photographs by Kenneth W. Ireland.)

Dr. Stoner, aided by Mr. Louis J. Koster, preparator at the New York State Museum, opened the 'tumor' on the right foot on March 11 and they recorded that "firm more or less structureless mass, surrounded by an inflamed, highly vascular capsule, is found to make up the bulk of the swelling. The skin of the foot itself is thickened, swollen and inflamed. The hardened central mass can be easily separated from the inner wall of this investing capsule."

A single owl fly, *Ornithoponus americanus* Leach, was taken from the feathers of the specimen; no other parasites were discovered.

The feet were submitted to Professor F. R. Beaudette, Poultry Pathologist of the New Jersey Agricultural Experiment Station at New Brunswick, New Jersey, for further determination as to the name of the disease and the cause of this malformation.

Excerpts from Dr. Beaudette's letter of March 17, 1944 give his diagnosis of the case which he has permitted us to quote in this article:

"From all appearances, this condition is no different than a similar one which is quite common in chickens and which goes under the common name of bumblefoot. The cause of this has never been positively determined although opinions have been expressed to the effect that it develops in birds that roost on sharp perches or in birds that will jump on hard surfaces insufficiently protected with litter. However, field observations indicate that the disease occurs in the flock whether these factors are present or not. In fact, they are usually absent.

"A bacteriological examination reveals negative or positive results depending upon whether a fistulous tract has formed or not. If the swelling has no communication with the exterior, cultures usually remain negative. Otherwise, the predominating type of organism is *Staphylococcus aureus*. Since this organism is widespread in nature, its presence in the abscess is easily accounted for whenever a fistulous tract develops.

"I made a stain of a smear from the [right] foot and it is clearly evident that cocci predominate although there are a few rod forms. I also took a culture without any idea of obtaining a growth since the specimen was packed in formaldehyde but to my surprise I find that there is quite an abundant growth on the plate, presumably the cocci and a few other colonies of the rods seen in the smear. I am quite sure that they have no primary causal relationship with the disease."

The February 20, 1944, issue of the New York Herald Tribune contained an account of the Griffon Vulture which died in the Bronx Zoo. It was reported that this bird was afflicted with bumblefoot. Dr. C. W. Leister, Curator of Mammals at the New York Zoological Park confirmed this above account in a letter to Dr. Stoner dated March 30, 1944, in which he said: "This bird was afflicted with bumblefoot for a long period of years . . . it [this disease] occurs with a fair degree of regularity in our captive birds kept indoors and with no particular relation to groups or species. Since it seldom if ever is a major cause of death it does not appear in our autopsy records."

The disease, bumblefoot, when present in poultry is frequently the result of an injury or bruise which causes pus to accumulate in the foot. If the pus is not let out the swelling often breaks of its own accord. However, in this case the pus remained and became more or less solidified into the cheesy masses which appeared as swellings. As far as we can ascertain, this is the first occurrence of bumblefoot recorded for the Great-horned Owl.

Although both legs of the owl were removed, the remainder of the specimen is preserved as a study skin and it, along with the unopened left foot which is preserved in fluid, and the fly now bear accession number 6442 in the New York State Museum collection.

REFERENCES

BUNYEA, HUBERT

1936. Acid-fast organisms found in so-called bumblefoot of chickens. *Jour. Amer. Veterinary Med. Assoc.*, 88 (n. s.), 41 (no. 3): 386-392.

BUNYEA, HUBERT AND WEHR, E. E.

1941. Diseases and parasites of poultry. *U. S. Dept. Agr., Farmers' Bull.*, no. 1652: 37.

KAUFF, B. F.

1921. A bacteriological study of abscess of the feet of single comb white leghorn hens. *Trans. First World's Poultry Congr.*, 1: 268-274.

New York State Museum

Albany, New York.

A SYSTEMATIC STUDY OF THE MAIN ARTERIES IN THE REGION OF THE HEART—AVES VI

TROGONIFORMES, Part 2¹

BY FRED H. GLENNY²

In a previous paper (1), the writer presented the basic arrangement of the main arteries in the neck and thorax of the Trogoniformes—based on the study of eight species of the family Trogonidae. A single basic arrangement-pattern was found to be characteristic for the family, while only slight variations in persistence of the ligamentous vestiges of the left radix aortae and the right ductus botalli were recorded. The species of trogons which were studied were found to be "aves laevo-carotidinae," and the primary ascending-oesophageal artery arose as a branch of the left ductus shawi.

¹ Contributions of the Department of Zoology, University of Toronto.

² Formerly Assistant, Department of Zoology, University of Toronto; now on active duty with the U. S. Army Medical Department.

Materials for this, as well as the previous study, were made available by Dr. Alexander Wetmore and Dr. Herbert Friedmann, United States National Museum.

MATERIALS

Single specimens of five species of trogons were dissected and diagrams of the arterial arrangements prepared. Specimens of *Apaloderma n. narina* (Stephens) no. 227150, *Curucujus melanurus macrourus* (Gould) no. 343950, *Pharomachrus mocinno costaricensis* (Cabanis) no. 19851, *Trogon curucui tenellus* (Cabanis) no. 343951, and *Trogon surucura* Vieillot no. 227281 were included in this study. Numbers after species names refer to specimens in the alcoholic collection of the United States National Museum, Washington, D. C.

OBSERVATIONS AND DISCUSSION

The basic ordinal arrangement-pattern is the same for all species thus far studied.

It should be noted that the left and right ductus shawi supply the oesophagus, trachea, bronchi, and connective tissues in the region of the heart. Furthermore, scapular arteries are to be found arising generally from the superficial cervical arteries.

The arrangement of the branches of the subclavian artery is the same as in the species previously discussed (1). All five species present a ligamentum aortae and except for *Trogon surucura* the ligamentum botalli is usually present and attached to the right pulmonary artery. In *Trogon surucura*, however, only the distal attachment—to the right radix aortae—is present as a ligamentous "button."

It is increasingly more obvious that there is a high degree of uniformity in the arterial arrangement-pattern of the Trogoniformes, in contrast to the large number of pattern-variations observed in the Coraciiformes (3) and Piciformes (2).

REFERENCES CITED

GLENNY, FRED H.

1. 1943. A systematic study of the main arteries in the region of the heart, AVES VI. Trogoniformes, Part 1. *The Auk*, 60: 235-239.
2. 1943. A systematic study of the main arteries in the region of the heart. AVES, Piciformes. *Proc. Zool. Soc. London, Ser. B.*, 113: 179-192.
3. 1943. A systematic study of the main arteries in the region of the heart.—AVES VII. Coraciiformes, Part 1. *Transact. Royal Soc. of Canada, Third Ser., Section V*, 37: 35-53.

Fort Jackson,
South Carolina

THE 1944 HURRICANE IN NEW ENGLAND

BY NORMAN P. HILL

IN the early evening of September 14, 1944, a tropical hurricane swept into southern New England causing widespread damage to trees and buildings with its high winds and flood tides. For the next week, reports of the ornithological results of this storm appeared; these seem of sufficient interest to warrant a more complete report.

Most extraordinary was the large number of Black Skimmers. Also of interest were Sooty Terns, Gull-billed Terns, Royal Terns, Wilson's Plovers and a Snowy Egret. The occurrences of these birds for the three days following the storm are tabulated. Other more usual birds which appeared in remarkable numbers or in remarkable places were Leach's Petrel, Golden Plover, Red Phalarope, Parasitic Jaeger, Herring and Laughing Gulls, and Forster's, Least, Caspian and Black Terns.

A word on meteorology. A hurricane may be described as a warm, moist mass of tropical air extending upward about 30,000 feet with a counterclockwise whirl of winds about it, the whole disturbance moved along by the prevailing winds. The centers, which average 40

TABLE 1

REPORTS OF SEPT. 15, 16, AND 17, 1944

BLACK SKIMMER			
NEW BRUNSWICK			
Kent's Island	50	Sept. 15	Joy (1 collected)
MAINE			
Ile au Haut	1	Sept. 15	Cottrell
Blue Hill	"100's"	Sept. 16	Waterman
Pine Point	20	Sept. 16	Webb
Swan Island	1	Sept. 17	Tousey
Ocean Park	20	Sept. 15	Webb
NEW HAMPSHIRE—none			
MASSACHUSETTS			
Newburyport	104	Sept. 17	Mass. Aud. Soc.
Ipswich	225	Sept. 17	Cottrell & Bradford
Manchester	16	Sept. 16	Burnett
Point of Pines	20	Sept. 15	Argue
Marshfield	150	Sept. 17	
Nauset	86	Sept. 17	Griscom & Hill
Martha's Vineyard	114	Sept. 17	Edey
Nantucket	50	Sept. 17	Heywood
Fall River	2	Sept. 15	Cooke

TABLE 1—Continued

RHODE ISLAND

Sakonnet	159	Sept. 17	Emerson
Dyer's Island	35	Sept. 15	Bowen
Bonnet Shores	50	Sept. 15	Ball
Newport	185	Sept. 15	Stackpole
Block Island	12	Sept. 15	Dickens

CONNECTICUT

Waterford	24	Sept. 17	White
Fairfield	65	Sept. 16	Saunders

SOOTY TERN

MASSACHUSETTS

Nantucket	1	Sept. 15	Heywood
-----------	---	----------	---------

RHODE ISLAND

Narragansett Bay	15	Sept. 15	Bowen
------------------	----	----------	-------

GULL-BILLED TERN

MASSACHUSETTS

Nauset	1	Sept. 17	Griscom & Hill
--------	---	----------	----------------

RHODE ISLAND

Sakonnet	1	Sept. 17	Emerson
Narragansett Bay	1	Sept. 15	Bowen

ROYAL TERN

MASSACHUSETTS

Chatham	1	Sept. 15	Griscom
Nauset	1	Sept. 17	Griscom & Hill

RHODE ISLAND

Sakonnet	1	Sept. 17	Emerson
Bonnet Shores	1	Sept. 15	Ball

WILSON'S PLOVER

MASSACHUSETTS

Newburyport	2	Sept. 21	Griscom
-------------	---	----------	---------

SNOWY EGRET

RHODE ISLAND

Warren	1	Sept. 16	Bowen
--------	---	----------	-------

miles in diameter, move relatively slowly (10-12 MPH) but the surrounding winds are of high intensity, more so on the right-hand side because there is added the forward movement of the center. The energy for maintenance of the disturbance is derived from the heat of condensation of water vapor as it is carried upward in the slow (2 MPH) vertical component of the winds.

The course of the September, 1944, storm was somewhat different from that expected of most late summer hurricanes which usually stay well off the Atlantic coast. This one presumably originated off the West African coast and moved slowly westward north of the West Indies. On September 11, the center was in the region of the Bahamas; it turned northward and was about 100 miles off Jacksonville, Florida, the next day. On September 13, it made a loop inside Cape Hatteras over the North Carolina sounds and then passed again to sea. Its forward motion became accelerated at this time and it passed over eastern Long Island late in the afternoon of September 14, proceeded north over Rhode Island and then turned east to pass again to sea between Boston and Plymouth and disappeared northeastward into the Atlantic.

Now, can the variety of birds found be correlated in any way with the course of the storm? There were essentially three groups of stragglers found: (1) those found normally at sea off the North Atlantic states (Leach's Petrel, Red Phalarope and Parasitic Jaeger); (2) one from tropical seas (Sooty Tern); and (3) those typical of the Carolina coastal region (Snowy Egret, Wilson's Plover, Gull-billed and Royal Terns and Black Skimmer).

The Leach's Petrel, Parasitic Jaeger and Red Phalarope may be disposed of quickly. They are normally found off the New England coast at this season and may be blown in by any storm; i. e. it does not require a hurricane to bring them.

The Sooty Tern has frequently appeared in New England after similar storms in the past. It was presumably picked up in the West Indian regions and carried northward.

Finally, it seems reasonable to hypothesize that the Skimmers, terns, etc. were picked up as the storm looped inside Cape Hatteras, in which region these birds are abundant. It is of interest to note that a storm in August, 1879, which followed almost the same course as the one under discussion, carried many Skimmers to New England. On the other hand, a storm of August, 1924, which stayed well offshore the whole length of the coast, also brought Skimmers; this, however, was somewhat of an exception as most storms following this regular course do not bring such stragglers.

Parenthetically, it may be well to add that while the storm undoubtedly accounted for the large numbers of Forster's, Black and Caspian Terns, as well as the late dates on Least Terns and numbers of late Laughing Gulls, it is harder to draw the line here between storm-borne stragglers and normal fall occurrences, as all of these are expected every year. Apparently the storm picked up migrating individuals and carried them back northward.

There have been reports from shipboard, mostly in the Caribbean, that many birds are found in the centers of the hurricanes, but most such records refer to migrating small land birds which are already far at sea when overtaken by the storm. There is no reason to believe that any birds are picked up by the center as it sweeps over them. More probably birds such as Skimmers are lifted off the ground somewhere on the right-hand side of the center when the wind velocity exceeds the stalling speed of their flight. Then the birds may be swept in the zone of high winds around the center one or more times, or they may congregate in the center. The pattern of the distribution of Skimmers in New England cannot help us solve the problem of where and how they are carried, for they were found on both sides of, as well as directly in the path taken by, the center. There is some evidence, however, that these birds were not reported where they were deposited by the storm but rather in favorable areas where they had collected to feed and rest. This evidence is the remarkable growth of the flocks at Newburyport from 104 to nearly 400 and on Cape Cod from 86 to 386. Perhaps this increase consisted of the New Brunswick and Maine birds drifting southward.

Finally, consider the loss of bird life that must have occurred. On Cape Cod, small land birds vanished from the coastal areas with the storm. There was no trace of them inland nor did they return so it seems likely they perished. A week later, the Starlings, Meadowlarks and Redwings were present in very small fractions of their expected populations. Also many gulls were found dead. It is obviously impossible to make a guess as to mortality among the Skimmers and terns, but a high one may be suspected.

SUMMARY

The ornithological results in New England of the hurricane of September 14, 1944, are reported and the course of the storm is described.

The large number of Black Skimmers is the item of particular interest. The presence of these birds may be accounted for by the course of the storm which, on its way north, swung inside Cape Hatteras where Skimmers are abundant at that season. There is insufficient evidence at hand to determine in what part of the storm the birds were carried.

There was considerable loss of bird life noted, particularly among the smaller land birds of Cape Cod.

15 Oxford Street
Arlington, Mass.

EFFECTS OF A TORNADO ON BIRD LIFE¹

BY H. ELLIOTT MCCLURE

Plate 20

At 3 A. M., July 9, 1940, a tornado of moderate violence struck Portsmouth, Iowa, a town with a population of about 300 and with an area of about 100 acres. During the afternoon of July 10, observations of damage were made, and the area was visited each week thereafter until September 25.

The town is situated on the southeast slope of a long hill. At the base of the hill is a business district, above which the residential district extends to the brow of the hill. At the northwest corner of the town, on the brow of the hill, are situated three brick structures: a school, church, and parsonage.

The storm approached from the northwest, but its vortex was slightly to the south of Portsmouth. As tornado winds in the northern hemisphere whirl counterclockwise, damaging winds blew here from the southeast, while in a town five miles south they blew from the northwest. Because of the shape of the hill, the wind leveled store buildings of the business district, damaged the residences less severely, and struck the brick structures on the hilltop, severely damaging the church. Although every home was affected by the storm, none was destroyed, no one was killed, and only a few people were injured. Severe wind blew for half an hour and was followed by hail and a two-hour torrential rain of five inches.

The town supported many fruit trees but few large shade trees before the storm, and the only evergreens were those of a spruce and pine windbreak to the north and west of the school and church. During the storm all deciduous trees were damaged and stripped of leaves, giving the area an appearance of winter. Grass was beaten down by heavy hail, vegetables in gardens were pulled up, flower gardens stripped, and fruit thrown from trees. The ground was covered with a heavy vegetable detritus. A survey of over 200 trees showed that the percentage of damage to leaf and limb structure was as follows: soft maple (*Acer saccharinum*), 90; apple (*Pyrus malus*), 90; catalpa (*Catalpa catalpa*), 90; Chinese elm (*Ulmus* sp.), 90; walnut (*Juglans nigra*), 90; ash (*Fraxinus* sp.), 80; mulberry (*Morus rubra*), 80; box

¹ Journal paper No. J-872 of the Iowa Agricultural Experiment Station, Ames, Iowa. Project No. 565. The Fish and Wildlife Service (U. S. Dept. of the Interior), Iowa State College, Iowa State Conservation Commission and the American Wildlife Institute cooperating.

Work on project 565 was done under the supervision of Dr. Geo. O. Hendrickson, Iowa State College, and Thomas G. Scott, U. S. Fish and Wildlife Service.

elder (*Acer negundo*), 70; honey locust (*Gleditsia tricanthos*), 70; American elm (*Ulmus americana*), 70; silver poplar (*Populus alba*), 50; arbor vita (*Thuja occidentalis*), 20; red pine (*Pinus resinosa*), 10; Norway spruce (*Picea abies*), 10; and blue spruce (*Picea* sp.), 10. Evergreens withstood the storm much better than did deciduous trees. Ten per cent of the town's trees had been blown down.

The most striking phenomenon noted after the storm was the stillness and the complete absence of bird voices. A city park covered about one acre (Plate 20, upper figs.), and there was a playground with an area of an acre and a half behind the church and school, including the evergreen windbreak. These two areas were thoroughly searched and the following dead animals found: Mourning Dove (*Zenaidura macroura*), 91; Eastern Robin (*Turdus m. migratorius*), 71; Bronzed Grackle (*Quiscalus versicolor*), 9; Northern Blue Jay (*Cyanocitta c. cristata*), 9; English Sparrow (*Passer domesticus*), 8; Northern Flicker (*Colaptes auratus luteus*), 7; Baltimore Oriole (*Icterus galbula*), 6; Eastern Kingbird (*Tyrannus tyrannus*), 5; Eastern Screech Owl (*Otus asio naevius*), 3; Red-headed Woodpecker (*Melanerpes erythrocephalus*), 2; Chimney Swift (*Chaetura pelagica*), 1; Brown Thrasher (*Toxostoma rufum*), 1; Black-billed Cuckoo (*Coccyzus erythrophthalmus*), 1; Catbird (*Dumetella carolinensis*), 1; Northern Downy Woodpecker (*Dryobates pubescens medianus*), 1; toad (*Bufo americanus*), 2; northern red bat (*Lasiurus borealis*), 1; cottontail rabbit (*Sylvilagus floridanus*), 1; and fox squirrel (*Sciurus niger*), 1. (Some of the storm's casualties are shown in Plate 20, bottom fig.)

Where English Sparrows had been roosting in trees, they suffered heavily, for 108 were found under six cherry trees. Those birds sustaining the fewest losses were the species that had their nests or roosts inside of trees or buildings. These included Red-headed Woodpeckers, English Sparrows, House Wrens (*Troglodytes aedon*), Chimney Swifts, and Barn Swallows (*Hirundo erythrogaster*). Several Red-headed Woodpeckers survived the storm, but all Flickers were killed. Why all of the Flickers were destroyed and not all of the Red-headed Woodpeckers was unexplained. All home owners that I interviewed mentioned picking up dead birds about their lawns but nearly all were too confused by other damage to remember how many. Based upon the number of birds found in park and school grounds, 323 in less than 3 acres, and upon observations throughout town, the average loss appeared to be about 10 birds per acre, or a probable total of 1000. On the day following the storm only 87 living birds were seen. These were: English Sparrow 50, Mourning Dove 10, Robin 2, Kingbird 1, Red-headed Woodpecker 1, Chimney Swift 20, and House Wren 3.

In this region of Iowa, Robins and Mourning Doves are of nearly equal abundance but they suffered losses of different proportions. The Robin population was practically eliminated while Mourning Doves survived the storm in greater numbers. Birds of lower population densities were extirpated.

By July 24, new leaves had sprouted from the uninjured parts of the trees. They were one-third open on box elder, ash, soft maple, mulberry, American elm, and Chinese elm; one-half open on birch (*Betula* sp.); one-quarter open on catalpa; and one-eighth open on walnut. At the end of the month, leaves on nearly all of the trees were almost fully expanded. On August 7, catalpa was in bloom and the remainder of the trees were as fully leafed as possible after their injuries. The upper two figures of Plate 20 show the city park immediately after the storm and a month later. Several severe wind and rain storms occurred during the two weeks following the tornado. Following these was an extended period of rain so that newly planted flowers made remarkable growth. By August 14, flower gardens were in as full bloom as they had been in the spring.

Red-headed Woodpeckers that had nests in those trees that were not destroyed continued rearing their young and increased in abundance until August 21. After this date they and their young migrated from the area. Following the storm the most abundant birds were English Sparrows. They built new nests and continued with their breeding. By the end of September they were present in large bands. House Wrens, with their houses in protected places, were not killed; and they continued nesting until the first week of September, when they left the vicinity. What percentage of Chimney Swifts was killed by rain and hail falling into chimneys was not determined, but a number of them were present until the middle of August. A small band of pigeons was seen each week.

Throughout the area surrounding Portsmouth, destruction of trees with suitable nest sites appeared to be complete. Until new leaves sprouted on the deciduous trees, the group of evergreens bordering the playground was the only available nest cover in an area of nearly a square mile. A few of the remaining birds in this area came to town in order to nest or roost among these trees. On the day following the storm only two Robins were noted alive, and one had an injured wing. It remained in town throughout the rest of the summer. Only three pairs of Robins came to the area and built nests, two of which were placed in crotches in box elders; another was built on the limb of an ash. All of these nesting attempts were successful in rearing fledglings, and young and their parents were seen together during August. By



(Top Figure) CITY PARK OF PORTSMOUTH, IOWA, FOLLOWING THE TORNADO OF JULY 9, 1940. (Middle Figure) A MONTH LATER. (Bottom Figure) DEAD BIRDS AND A RABBIT COLLECTED FROM THE SCHOOL PLAYGROUND AFTER THE TORNADO.

Vo
19

Se
m

th

th

ne

ne

mi

ma

Ev

vic

of

us

Th

Ju

Se

we

we

th

we

wh

vir

we

Iov

lat

sto

ma

No

Ea

Ca

Sta

am

21

No

Ba

At

ten

not

the

Be

rel

fau

September 18, the Robin population was augmented by a small migratory flock.

The only other bird noted continuing its nesting activity following the storm was the Mourning Dove. Ten living doves had been seen the day after the storm. One week later there were two active dove nests. Two weeks after the storm, on July 24, there were 13 active nests, indicating a population of at least 26 doves. Evidently 16 had migrated into town from surrounding areas. Heavy storms destroyed many of these nests so that by August 7 there were only seven active. Evidence appears to indicate that those pairs with nest failures left the vicinity, for no more than seven active nests were present for the rest of the breeding season. During the three months, two nests were used twice; the last young left them in the latter part of September. The number of active nests found each week was as follows: July 17, 2; July 24, 13; July 31, 9; Aug. 7, 7; Aug. 14, 7; Aug. 21, 7; Aug. 28, 7; Sept. 4, 6; Sept. 11, 4; Sept. 18, 4; and Sept. 25, 1. Twenty-four nests were used 26 times. Eleven, or 42 per cent, of these nesting attempts were successful, and 15 young were raised. Twelve, or 50 per cent, of the nests were built in deciduous trees, and 12 in evergreens. Eight were built in box elder, seven in Norway spruce, two in ash, two in white pine (*Pinus strobus*), and one each in catalpa, juniper (*Juniperus virginiana*), mulberry, arbor vitae, and red pine.

The paucity of birds in a tornado-stricken area, even after several weeks, was shown by a census of an undisturbed ten acres at Lewis, Iowa, fifty miles south of Portsmouth. On August 23 the bird population in Lewis was nearly normal, having been affected by no severe storms. The number of birds seen was as follows: English Sparrow, many; Mourning Dove, 50; Eastern Robin, 25; Bronzed Grackle, 6; Northern Blue Jay, 10; Northern Flicker, 5; Baltimore Oriole, 3; Eastern Kingbird, 2; Red-headed Woodpecker, 15; Brown Thrasher, 1; Catbird, 1; Northern Downy Woodpecker, 2; Eastern House Wren, 2; Starling (*Sturnus vulgaris*), 2; and Yellow-billed Cuckoo (*Coccyzus americanus*), 3. The number of birds seen at Portsmouth on August 21 was: English Sparrow, 200; Mourning Dove, 16; Eastern Robin, 5; Northern Flicker, 1; Red-headed Woodpecker, 11; House Wren, 4; Barn Swallow, 10; Starling, 1; and Nighthawk (*Chordeiles minor*), 6. At Lewis, excluding English Sparrows, 127 birds were counted on the ten acres; while at Portsmouth, excluding sparrows, only 53 were noted in 100 acres. The species of trees present in the two towns were the same and each had about the same number of trees per acre. Because of the similarity in habitats it was possible to compare the relative number of birds. Portsmouth in August supported an avian fauna of a density only four per cent of that of Lewis.

Owing to my removal to central Nebraska the year following the storm, I was unable to make further observations to determine the rate at which the habitat was refilled.

SUMMARY

In western Iowa, the small town of Portsmouth was struck by a tornado at 3 A. M. on July 9, 1940. An estimated 1000 birds were killed in the town's area of 100 acres, and, following the storm, 87 were found alive. The storm apparently killed over 90 per cent of the birds in the path of its vortex.

Birds least affected by the wind and torrential rain were those roosting in buildings or nesting in tree hollows. Only seven species appeared to have survived.

In the following summer months, Mourning Doves, Robins, Red-headed Woodpeckers, House Wrens, and English Sparrows continued their nesting activities.

During the last week of August, the bird population in an undisturbed similar habitat at Lewis, Iowa, was compared with that of Portsmouth. Excluding English Sparrows, which were numerous in both areas, the bird population per acre averaged 12.7 at Lewis and 0.53 at Portsmouth; that at Portsmouth was still only four per cent of normal.

These observations revealed the remarkable stability of established breeding-bird populations. The void created by a tornado was not filled by an influx of birds from undisturbed areas a few miles away.

Ord, Nebraska

COMMUNITY SELECTION BY BIRDS ON THE HELDERBERG PLATEAU OF NEW YORK

BY S. CHARLES KENDEIGH

INTRODUCTION

A QUESTION that repeatedly arises in the ecological analysis of an avifauna is why various species are either restricted to, or are more common in, certain communities than in others. On a broad geographic scale, barring physical barriers of one sort or another, species are often limited by climatic conditions which they are unable to tolerate (Kendeigh, 1934). When the boundaries of a species' range agree with those of an ecological community, this may be due to coincidence in limits of tolerance to extremes in environmental conditions by species and community, or it may be due to some obligatory relation

of the species to that particular community (Trotter, 1912; Pitelka, 1941; Peterson, 1942; Brecher, 1943). Within any region of restricted size the macro-climate is relatively uniform, although differences in micro-climate may still occur between different parts of a single community or between different communities. Local segregation of species into different communities may, in some cases, be in response to these differences in micro-climate, although the significance of these small differences in climate is often difficult to evaluate (Moreau, 1934). Oftentimes the restriction of a species to a community appears to depend upon the occurrence of a particular niche within the community that the species requires. As Lack and Venable (1939) explain, "A species may be limited in its habitat distribution by various factors: food (e. g. crossbill), feeding habit (flycatchers), song post (blackcap), nesting site (hole-nesters), nest material (nightingale), and roosting place (pheasant)." In many cases, on the other hand, there is no very obvious reason for the limitation of the species to a certain community.

The present study attempts to analyze the restriction of breeding birds, especially warblers, to various biotic communities in a sere that develops in abandoned fields on the Helderberg Plateau of New York. The work was centered at the Edmund Niles Huyck Preserve at Rensselaerville, about 30 miles southwest of Albany, during the summers of 1942, 1943, and 1944. This paper also includes some observations made by Dr. Eugene P. Odum for the two preceding years at the Preserve. Considerable literature was reviewed for compiling the information on nesting requirements of each species, but only those references actually cited are included in the bibliography.

Four distinct communities are recognized in this sere in abandoned fields: grassy fields, mixed shrubs and small trees, hemlock-beech, and beech-sugar maple-hemlock. Probably the last community is the ultimate climatic climax. This is a predominantly deciduous forest in which beech (*Fagus grandifolia*) and sugar maple (*Acer saccharum*) are particularly important and where there are only scattered hemlocks (*Tsuga canadensis*) present. The hemlock-beech community is predominantly evergreen in character, as the beech and yellow birch (*Betula lutea*) that occur along with hemlock are few and scattered. The composition of the avifauna was determined for each community and the size of the breeding bird population was measured for each of the last three communities. A similar study of grassland birds had previously been done in northwestern Iowa (Kendeigh, 1941).

The segregation of species into one or another community is not absolute as the communities are themselves not sharply delimited. Some birds follow isolated shrubby plants into otherwise grassy

fields, forest species penetrate into the older stages of the mixed shrub and small tree community, likewise shrub-inhabiting species regularly occur on the forest-edge, and finally the evergreen forest contains some deciduous trees and vice versa. When the same species occurs in two or more communities, it may not be equally abundant in each so that its more favored position is indicated. In analyzing the factors involved in community selection by birds, the difficulty is experienced that much of the evidence is intangible, obscure, inferential, and not subject to experimental proof at the present time. It is worth while, however, to marshal the evidence, such as it is, in hopes that the analysis may suggest a more objective approach in future studies.

GENERAL FEATURES

Grassland.—The characteristic species of the grassland community nest and feed on the ground: Vesper Sparrow (*Pooecetes gramineus*), Grasshopper Sparrow (*Ammodramus savannarum*), Bobolink (*Dolichonyx oryzivorus*), Meadowlark (*Sturnella magna*), Killdeer (*Charadrius vociferus*). Although most of these species may use elevated perches for singing, these perches are not required, as the birds commonly sing from the ground or from tall stalks of herbaceous plants. The Meadowlark, Bobolink, and Killdeer also have songs or calls that they give while in flight which are of aid to them in establishing territories or advertising for mates. When shrubs and trees invade the grassland, these species disappear.

Mixed Shrubs and Small Trees.—The bird's mores in the shrub and small tree community are as heterogeneous as is its species composition of plants and animals. The Yellow-throat is perhaps the least dependent on shrubs or trees as it feeds and nests in dense grass, herbs, or briers, and may sing from the ground or in flight. However, when shrubs are available it often makes use of them for these various purposes. The Towhee (*Pipilo erythrophthalmus*) also nests and feeds on the ground but requires shrubs or trees from which to sing and as a refuge from danger. The Chestnut-sided Warbler, Song Sparrow (*Melospiza melodia*), Field Sparrow (*Spizella pusilla*), and Catbird (*Dumetella carolinensis*) are outstanding in their dependence on shrubs, while most of the other species in this community use trees or tall shrubs indiscriminately.

Two things that birds in grassy fields, shrubs, and scattered trees have in common are large open spaces for flight and other activities and frequent exposure to the sun. Nests of all species, even those that occur on the ground, are ordinarily concealed in partial or com-

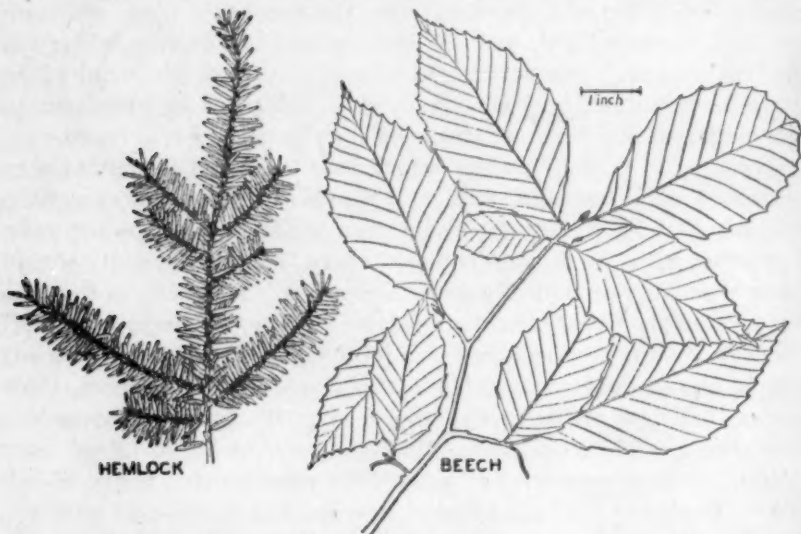
plete shade, but other activities of the birds may be carried on under maximum light exposure. In this they differ from forest birds which spend more or less of their time under the canopy of trees, are more restricted in their flight, and are less exposed to the sun during the breeding season. Laboratory experimentation will be required to determine whether there is actually any difference in toleration to solar radiation and upon what physiological property it is based.

Forest.—The chief differences between the two types of forests above mentioned are at least four-fold. (1) The hemlock forest is evergreen, retaining its foliage and casting its deep shade throughout the year, in contrast with the deciduous forest where the light intensity within the forest changes drastically with the seasons. However, at the time that most of the forest inhabitants arrive in May, the deciduous forest is well on its way toward renewal of its foliage, so that the two forests become more nearly comparable in this respect. Furthermore, those species that nest earlier in the spring when the light differences are most pronounced, such as the Black-capped Chickadee (*Parus atricapillus*), White-breasted Nuthatch (*Sitta carolinensis*), Hairy Woodpecker (*Dryobates villosus*), Pileated Woodpecker (*Ceophloeus pileatus*), Blue Jay (*Cyanocitta cristata*), and Great Horned Owl (*Bubo virginianus*) are among those that occur with nearly equal abundance in the two forests.

(2) Another difference is the matter of food. Many forest birds are largely insectivorous during the breeding season. There are differences in species of insects found in deciduous and evergreen forests, although there is a decided ecological similarity between them and some of them belong to the same family (Blake, 1926). Modern concepts (McAtee, 1932) emphasize that birds mostly obtain their food from that which is most accessible to them, of the type that they require, without regard to species, so it is doubtful if limitation of birds to communities can be satisfactorily explained by the species of food organisms available. Seed-eating sparrows, however, are more often found in grassy and shrubby fields, where their type of food is abundant than in forests.

(3) There is a difference between deciduous and evergreen forests in the ground-covering that affects the food supply and location of nests of those birds that occur on the ground. The broad leaves of deciduous trees decompose relatively fast and form a rich, loose humus, often with an abundance of small animals. Needle leaves, when shed, turn brown and accumulate to form a thick compact layer on the ground that decomposes very slowly and contains fewer insects and other small animals useful for food (Blake, 1926).

(4) Finally, there is the difference in the size and arrangement of the leaves (Text-fig. 1). The hemlock leaves are short, needle-like,



TEXT-FIG. 1.—Difference in arrangement and size of leaves of hemlock and beech.

and arranged close together along the lateral sides of the small twigs. Deciduous trees have much larger leaves with broad surfaces from which food may be gleaned, and these leaves are suspended by means of petioles at greater intervals along the twigs.

SPECIFIC NESTING REQUIREMENTS

THRUSHES.—Of the five thrushes found in the region, the Bluebird (*Sialia sialis*) and Robin (*Turdus migratorius*) are chiefly forest-edge species. The Veery (*Hylocichla fuscescens*) is also partial to the late shrub and early tree stage but penetrates the interior of both deciduous and mixed forests. One nest found of the Veery was on the ground well inside a beech-maple-yellow birch forest. The nest was made of broad leaves and rootlets. Another nest was in the fork of a small maple six inches above the ground, well within a maple-hemlock-beech wood. The nest was made of dried maple leaves. The Wood Thrush (*Hylocichla mustelina*) was found infrequently but in all instances was among deciduous trees, even in the hemlock-beech woods. However, this species will also nest in evergreen bogs (Root, 1942).

The Hermit Thrush (*Hylocichla guttata*) was recorded in equal abundance in the two types of forests, and this is reflected in its wide

choice of situations for nesting. Peterson (1942) believes that it prefers mixed forests. Certainly the species is not averse to using deciduous as well as evergreen trees for song posts. One bird had a regular singing perch at the top of a dead tree projecting six feet above the canopy of a young maple forest and about 50 feet above the ground. Other males commonly sang, however, from much lower down, often in hemlocks only 15 feet from the ground. A nest described to me was on the ground in a patch of yew (*Taxus canadensis*) under hemlock. One nest found was in a clump of sedge under Labrador tea (*Ledum groenlandicum*) in a sphagnum bog. The nest was lined with pine needles. Another nest was in a partial opening surrounded by aspen, willow, and white pine (*Pinus strobus*). The nest was on the ground and made largely of moss with a lining of dried grass. A fourth nest was placed on the ground near the center of the hemlock-beech woods. It was placed in a depression under a spray of hemlock and made of dead hemlock twigs and plant stems. The most unique situation, however, was a nest placed three feet above the ground on a horizontal branch next to the main trunk of a small spruce which was eight feet tall and artificially planted in the forest edge. The nest was made of spruce needles and moss and was lined with pine needles, doubtlessly obtained from an artificial planting near by. This species appears to have a preference for evergreen nest-sites and nest materials when available.

VIREOS.—One of the most noticeable differences in the avifauna of deciduous and evergreen forests is the great number of Red-eyed Vireos (*Vireo olivaceus*) in the former and their virtual absence from the latter. Their activities were confined largely to the deciduous trees when in mixed forests. On the other hand, the single pair of Blue-headed Vireos (*Vireo solitarius*) recorded on the Preserve occurred among the hemlocks, although elsewhere they were also found in deciduous forest.

Four nests of the Red-eyed Vireo were located, three at a height of six feet and one at 12 feet above the ground in young trees of beech, basswood (*Tilia americana*), and sugar maple, all being fastened inside of slender horizontal forks as is usual for the species. The nests were made of dried grass, shreds of bark and weeds, and leaf stalks; two contained numerous small twigs of hemlock, and two contained broad pieces of white birch bark (*Betula papyrifera*). The Blue-headed Vireo built a nest seven feet up, suspended from a horizontal fork near the end of a hemlock branch. The nest was made of strips of white birch bark and plant stalks. The bird also nests in deciduous trees. There is no obvious reason why the Red-eyed Vireo should not also nest in hemlock, although it is not known to do so.

One difference in the feeding habits of the two species was noticed. The Red-eyed Vireos commonly fed near the ends of the smaller twigs and from the broad leaf-surfaces themselves. They have difficulty in feeding on hemlock twigs because of the arrangement of the needle leaves, and likewise these needles furnish less surface from which food can be gleaned. Only once were two birds seen feeding in hemlock and they did so not by their usual movements outward to the tip of the twigs but by alighting from above onto sprays clumped together sufficiently to hold their weight. On the other hand, the Blue-headed Vireo, when feeding in hemlocks, seeks its food from near the base of side branches and from the numerous projecting dead stubs that occur in this forest.

WARBLERS.—The best represented family in the area is that of the wood warblers. Altogether, seventeen species were recorded during the three summers, but only with twelve species was sufficient information obtained to make worth while a consideration as to how these closely related species have become adjusted to a variety of communities and situations.

Black and White Warbler (*Mniotilta varia*).—The Black and White Warblers are more commonly found in or near the forest-edge and in abandoned fields as soon as a good stand of trees develops than in the forest-interior, but in the forest-interior they occur to about an equal extent in pure deciduous and in mixed forests. Most of their activities take place as they climb over the trunks of trees. However, when singing for territories or mates, they perch crosswise on dead branches near the tops of exposed trees. They nest on the ground. Two nests were found well inside beech-maple-hemlock forests. One was nestled under the buttresses at the base of a yellow birch. The outside of the nest was made of beech leaves, with the middle layer of shreds of bark including that of yellow birch, and the inside was lined with white rootlets. The other nest was on a low hillside, partially concealed under the spray of a hemlock branch caught to the ground by a mass of dead leaves. The nest consisted of dead beech leaves and hemlock twigs. Nests are invariably reported as sunken under the shelter of the base of a tree or a bush, stump, log, or rock. The nest is usually constructed of dead leaves, strips of bark, and grasses, and lined with rootlets or hair. The structure of the nest indicates a preference for materials from deciduous trees but not exclusively so.

Nashville Warbler (*Vermivora ruficapilla*).—The Nashville Warbler regularly sang and fed in both deciduous and evergreen trees on the forest margin and in shrubby fields at heights from 15 to 30 feet. No nests were found, but others report this species as breeding in both

dry upland fields and occasionally in swamps as long as they have relatively open areas with scattered clumps of trees and shrubs. The nest is sunken in the ground, usually in a tuft of grass or moss under a tree or shrub, and is constructed of dead grass, bits of moss, leaves, strips of bark, and pine needles, and lined with grass, pine needles, rootlets, or hair.

Magnolia Warbler (*Dendroica magnolia*).—Although the Magnolia Warbler was observed a few times in the beech-maple-hemlock forest, it belonged almost exclusively to hemlock or evergreen communities. The species occurred equally well in the dense forest-interior and at the forest-edge, as well as in dense plantings of spruce (*Picea canadensis*, *P. abies*) and pine (*Pinus resinosa*). For song posts it commonly selected exposed dead branches of hemlock, but was also observed in birch, white ash (*Fraxinus americana*), and beech, usually between 10 and 45 feet above the ground. It fed in similar situations as it sang.

Of three nests found, one was made of dried leaf stalks with many spider nests on the outside, set simply on a horizontal limb of a small spruce with the short needles holding it in place. It was four feet from the ground and in a dense artificial planting. The birds divided their time between this spruce-pine planting and the near-by hemlock forest-edge. Another nest was placed 14 feet up in a medium-sized hemlock near the center of the hemlock-beech woods. It was placed precariously on top of a spray of needles six feet out from the trunk, depending again on the short needles projecting into the nest structure to hold it in place. The nest was flimsily made of hemlock twigs and dry grass and lined with brown tendrils of uncertain origin, probably the "moss-stems" of Nichols (1919). The third nest was also near the center of this same wood, six feet above the ground, and suspended in a dense spray of twigs, some of them dead, of a hemlock tree that had been blown over. The spray of twigs formed an intertwining meshwork that held up the nest. The nest was made of hemlock twigs and a small amount of dried grass.

From the literature, it seems that the Magnolia Warbler is very partial to spruce and hemlock forests with nests also found in fir, juniper, and rarely in deciduous shrubs and trees. Most observers have found the species more common in low second-growth trees in open situations than in dense forests. Most nests were placed within ten feet of the ground, although a few have been reported up to 35 feet. The nest may be constructed of twigs of spruce or hemlock, pine needles, or dried grass, and usually lined with black rootlets or horse-hair. Mousley (1924) gives a photograph of a nest loosely placed in a fork of a spiraea bush. The occasional occurrence of the species in

deciduous shrubs and forests (Brooks, 1940) must be distinctly a matter of second choice.

Black-throated Blue Warbler (*Dendroica caerulescens*).—The Black-throated Blue Warbler occurred commonly in both types of forest but appeared to make more use of broad-leaved trees than of hemlock. They were commonly observed singing on exposed, often dead, branches, 18 to 36 feet above the ground, in either hemlock, beech, or maple trees. Likewise they fed in all situations. One nest was found only 60 feet from an open field in a young stand of second-growth deciduous trees. The nest was placed in a fork of a purple-flowered raspberry (*Rubus odoratus*) only a foot above the ground. Bark strips, including considerable white birch, entered into its outer construction, dried grass formed the middle portion, and the lining was of black rootlets and light-colored plant fibers.

In the experience of other observers the species is commonly found in deep forests with dense underbrush, the forests being either such hardwoods as oak, maple, beech, or chestnut, or pine-hemlock, or mixed evergreen-deciduous trees. They nest in the undergrowth from only a few inches above the ground in a clump of ferns to usually not over ten feet up in maple, beech, honeysuckle, balsam fir, rhododendron, laurel, speckled alder, and yew. The nest is generally described as bulky with an outer construction of small pieces of rotten wood and bark fibers or shreds held together with weed stalks, grasses, or spider webs and lined with black rootlets, black or white hairs, pine needles, or bits of moss. It appears that a dense undergrowth is a primary requirement while the species composition of the tree stratum is of secondary importance.

Black-throated Green Warbler (*Dendroica virens*).—All birds of this species on the Preserve and throughout the Helderbergs appeared confined to, or in the immediate vicinity of, hemlock trees and only infrequently did they visit deciduous trees. Their song posts and feeding areas were commonly from 20 to 60 feet above the ground. Two nests discovered, one by Odum, were 18 and 20 feet up in hemlocks although others have reported them from close to the ground in scraggly forests to as high as 70 feet in tall trees. One of the two nests was placed in the angle formed by two small side branches with the main trunk. Although nests are probably placed more commonly, when in hemlock, well out on sprays of horizontal branches, Burleigh (1927) and Saunders (1938) report nests in birch and beech placed next to the trunk and similarly supported by one or more side branches. The nest may be composed of grasses, weed stems, spruce twigs, birch bark, rootlets, pine twigs, or shredded bark, and lined with hair,

plant fibers, or fern leaves; the variety of material suggests that the species uses what is available in the vicinity.

An interesting variation in ecological position occurs with this species. Brooks (1940) has reported that, in the Central Allegheny Mountains, Black-throated Green Warblers are commonly found in northern hardwoods and in oak-hickory forests and are not dependent on hemlocks or other conifers for nest-sites. Odum remarks in a letter that a subspecies (*D. v. waynei*) consistently nests in trees other than conifers in the coastal region of South Carolina. At elevations over 2000 feet in the Catskill Mountains, this Warbler was found to be very abundant in extensive forests of nearly pure beech and sugar maple. The fact that on occasions, at least, the bird builds its nest in a crotch between the main trunk and side branches in hemlock would permit their choosing similar positions in deciduous trees. There is evidence from rotting stumps and logs scattered through this deciduous forest in the mountains that conifers were once more abundant than at present. Perhaps this species is more plastic in choice of nest-sites than its nearest competitors, and when the conifers became eliminated the species quickly became adjusted to its new environment and even increased in number.

Blackburnian Warbler (*Dendroica fusca*).—This species is the most strictly confined to hemlock trees of any warbler in this region. It belongs to the tree-tops, singing and feeding at heights of 35 to 75 feet from the ground. Rarely was the bird seen in deciduous trees, and even in woods where the hemlock occurred singly or in small groups the bird was almost invariably associated with these isolated trees.

One nest found near the center of the hemlock-beech forest was 35 feet up in a hemlock, six feet out on a horizontal branch, and about ten feet from the top of the tree. The nest was well supported on three horizontal branches. Other nests reported in the literature range from 18 to over 80 feet above the ground in hemlock, white pine, spruce, cedar, and rarely in sugar maple and chestnut. The nest is commonly made of hemlock twigs, rootlets, or pine needles, sometimes with interwoven *Usnea* lichen, and lined with horsehair or fine lichens.

Chestnut-sided Warbler (*Dendroica pensylvanica*).—One of the most characteristic and well adjusted species in shrubby fields is the Chestnut-sided Warbler. It regularly does all its feeding in bushes and young trees, usually within ten feet of the ground. It may sing from a low bush but more commonly assumes a higher perch, often an exposed dead branch, and occasionally goes as high as 30 feet. It may do some feeding at this height, but its obvious purpose there is

singing. Four nests found by Odum and myself were in bracken fern (*Pteris aquilina*), in briers, and in a cultivated shrub, at heights of 1, 2½, 3½, and 6 feet from the ground, fastened between vertical stalks, and made of dry grass, stems, and rootlets.

All observers agree that the species avoids the dense forest and is found only in open situations. Chapman (1907) and Forbush (1929) mention that they also avoid evergreen trees. There is no known record of a nest over six feet from the ground and the common height is only two feet. Grasses, plant fibers of various sorts, and bark shreds are commonly used in the construction of the nest. The outside is usually covered with spider webs and plant-down and the lining may be grass, rootlets, or hair.

Oven-bird (*Seiurus aurocapillus*).—One of the most abundant warblers, equally numerous in the hemlock-beech and in the beech-maple-hemlock forests, is the Oven-bird. Although generally considered a characteristic bird of deciduous forests, various observers have reported it also in forests of white pine, spruce, and balsam fir. Brooks (1940) reports that it is absent in older, more mature stands of spruce. Eaton (1914) probably states the true situation in that the species "prefers a rich deciduous woodland—but is equally common in mixed woodlands, and in the North Woods I have found it where the growth was predominantly spruces and pines with only a few deciduous trees intermingled."

The Oven-bird uses the trees for overhead protection and sings from their lower, often dead, branches as well as from the ground. The species also has a flight song as do many ground birds, although here it would seem unnecessary and actually it is not frequently given. Most of the feeding is done from the ground, although some food may be obtained from the lower branches of trees. All nests are on the ground.

One of the four nests found was in a patch of yew, the other three on hillsides covered with dead leaves. The nests were, in all cases, made of the dead leaves of maple and beech, dried grass, leaf stalks, and black rootlets. In no case did hemlock material enter the construction. Chapman (1907) describes their nests as composed largely of dried leaves and leaf skeletons, with occasional bits of moss, and as rather coarsely lined with grasses, blossom stalks, etc. In the nests were "dead and decayed leaf stems and leaves of the chestnut, oak, beech, maple, cherry, dogwood and hickory, principally the first two." Forbush (1929) and Nice (1931) record nests lined with white pine needles.

It may well be that the occurrence of dead leaves from broad-leaved

trees is prerequisite before nests can be built, and the occurrence of the species in needle-leaved evergreen forests is conditioned on the occurrence of at least scattered broad-leaved trees to furnish nest material. Certainly in the hemlock-beech community studied, Ovenbirds tended to avoid the purest stands of hemlock, and the territories of occasional birds that did occur in such situations extended well out into the forest-edge where there were many deciduous shrubs and trees. Through most of the forest there were sufficient yellow birch and beech to furnish nest material.

There is no obvious explanation of why this ground-adjusted species should not also occur in the early stages of the mixed shrub community or even in grassland. Peterson's (1942) statement that they require a "closed crown" appears to be true, and there may be some physiological or climatic factor involved that makes a closed canopy desirable. Hann (1937) states that no nests that he found were placed within 60 feet of the forest-edge, but he made the observation that "all nests seemed to get a little sunshine each day, but in most cases the amount was small."

Louisiana Water-Thrush (*Seiurus motacilla*).—The Louisiana Water-Thrush is fairly common along streams in the vicinity. None was listed for the particular areas intensively studied, probably because the streams that traverse them are temporary, drying up in late spring. One nest was placed elsewhere in a situation quite typical of the species—depressed into the somewhat mossy ground under the projecting roots and base of a small tree. The nest was half-way up a ten-foot bank at the edge of a permanent pool of a stream inside a deciduous forest. It was constructed of dead leaves and leaf-stalks of maple and beech. The chief requirement of this species appears to be nearness to small streams along the edges of which it gets all its food. The Northern Water-Thrush (*Seiurus noveboracensis*) was recorded once in 1943 at the 'vly,' a sphagnum bog surrounded by hemlock, white pine, and black spruce (*Picea mariana*); and Odum found a nest with young birds in a hemlock-yellow birch bog.

Yellow-throat (*Geothlypis trichas*).—Although very common in fields containing grasses, herbs, and shrubs, the Yellow-throat appears partial to patches of tall herbs and succulent plants other than grasses, especially such as grow in damp habitats. One nest was found at the edge of a pond in a clump of lilies, raised one-and-a-half feet above the ground, and loosely held in a fork made by adjacent leaves. It was composed largely of dry grasses. Another nest was in a small opening at the edge of the hemlock-beech forest. It was placed in a patch of fern (*Onoclea sensibilis*) about eight inches above the ground. The nest was composed of dried grass with beech leaves on the outside.

Authorities agree that the species is common where rank growths of grasses, herbs, briars, bushes, and trees grow in damp situations. However, they also occur in drier habitats and their requirement is probably more for the dense growth of low vegetation, such as is more prevalent in wet habitats, than because of any direct relation to the water itself. Nests are reported usually on or near the ground in clumps of grasses, weeds, or briars, but there are records of nests four and five feet up in bushes (Chapman, 1907; Todd, 1940). Nests are usually made of coarse grass, leaves, weed stalks, and strips of bark, and lined with fine grass or horsehair.

The Yellow-throat feeds on or near the ground and occasionally up to five feet in shrubs. It commonly sings from the midst of ground vegetation, from shrubs, or occasionally from tops of trees 40 feet high. It is not dependent upon elevated song posts, however, as it has a flight song. Although well adjusted to the ground stratum, it is not extensively found in the grassy field community.

Canada Warbler (*Wilsonia canadensis*).—The Canada Warbler was more numerous in the hemlock-beech forest than elsewhere but was not confined to it and showed some partiality for the forest-edge over the forest-interior. Males sang all the way from two to 32 feet above the ground, mostly in hemlock. At the greater heights the birds did nothing but sing, usually from exposed perches; at intermediate heights they both sang and fed, while near or on the ground they spent most of their time feeding.

One nest found was in a hummock of moss at the edge of a small wooded bog under a limb of a fallen tree covered with *Cladonia* lichen. The nest was only a foot above water and was surrounded by cinnamon fern (*Osmunda cinnamomea*) and young hemlock. Another old nest was on the side of a deep wooded ravine, sunken in a thick bank of moss and surrounded by yew. It was under hemlock, yellow birch, and striped maple (*Acer pennsylvanicum*). A third nest, containing young birds, was in a bank at the side of a small stream that contained water only in the spring. The nest was well sheltered under roots in the middle of the deciduous forest with only scattered hemlock about. Moss was almost lacking in the vicinity.

The first nest was made of fern leaves, other leaves that were probably beech, grass stems and shreds, and lined with both black and white rootlets. The second nest was made almost entirely of rootlets with the lining all black. The third nest was constructed of dry deciduous leaves and stems, grass, bark shreds, and black rootlets.

Other observers record the Canada Warbler as a bird of dense deciduous undergrowth in damp woods or forest-edges and occurring

in deciduous or mixed forests. The undergrowth may be rhododendron, laurel, azalea, blueberry, blackberry, or ferns. The nest is usually sunken in a moist, mossy bank, in ferns, under rotting logs, or in other similar situations. It may be composed of dry leaves, grass, weed stalks, moss, or bark-strips, and lined with grass or rootlets.

It appears that this species prefers a forest canopy, although not necessarily a dense one, since the forest-edge is commonly used, as long as there are shrubs or low vegetation present and a moist bank or other shelter in which to place its nest. The nest-site may be concerned in its community selection. Although it uses a variety of materials from which to build its nest, it appears not commonly to use any parts of evergreen trees. The fact that locally the species was more common in the hemlock-beech forest than elsewhere was probably due not to affinity for hemlock but rather to the occurrence there of the damp, shrubby areas with mosses and ferns that it prefers.

Redstart (*Setophaga ruticilla*).—On the Preserve, Redstarts were found chiefly in tall shrubs and open woods and had not penetrated the forests proper. Males were occasionally observed giving their territory songs 40 feet above the ground, but the usual height was half of this. Food was secured from trees, shrubs, and the ground. Most authorities state that the species prefers second growth and usually places its nests in saplings of various broad-leaved trees. However, in one locality on the Helderberg plateau a dense colony was found in a sugar maple grove where the trees formed a canopy 60 feet high. The birds kept mostly at the lower levels.

Three nests were found, one eight feet above the ground in a vertical fork of a hawthorn (*Crataegus*), the other two, each six feet up in a vertical fork of a viburnum. The first nest was insecurely fastened and in an exposed situation alongside a road, so its later destruction was probably due to a heavy wind. Nests are almost invariably in vertical forks at heights of six to 12 feet above the ground, but occasionally as low as two feet and as high as 35 feet. Nests are made of shreds from plant stalks, plant down, bark strips, grasses, and spider webs, and are lined with fine grasses, rootlets, or hair.

DISCUSSION

Each species must be considered independently when analyzing its dependency on the environment, as different species exhibit various degrees of segregation to particular communities and each species may have a different set of limiting factors. Morphological adaptations of animals to special environmental situations have been much emphasized and are necessarily fundamental. The color or color

pattern may conceal a species from its predators in one community better than in another and afford it a greater chance of producing abundant offspring. However, structural and color adaptations do not explain the segregation of the species here under consideration.

Closely joined with structural modifications are functional adjustments. Palmgren (1932) has explained the avoidance of birch trees with their drooping branches by *Regulus r. regulus* as due to the weak functional development of a particular muscle in the legs. It is quite possible that separation of forest and non-forest inhabiting species may depend on the functional units of the retina and on the adaptation of the eyes to light intensity (Walls, 1942). Different degrees of tolerance to climatic factors other than light intensity appear to be important in explaining geographic dispersal, but the small differences in micro-climate between various local communities do not seem sufficient to account for the pronounced local segregation of species. Much more detailed experimentation in the physiology of birds must be conducted, however, before the full significance of these factors can be ascertained.

In addition to its morphological and physiological adjustments to the environment, each species also has a psychological adjustment for the utilization of its particular niche in the community that takes the form of a definite behavior pattern (Lack, 1933, 1937; Moreau, 1935; Mayr, 1942; Miller, 1942). Such a behavior pattern, for example, is that of the Oven-bird that builds an overarching nest of broad leaves in contrast to the Canada Warbler that gets essentially the same overhead protection by placing the nest under some overhanging root, log, or clump of moss. A stereotyped behavior pattern appears to limit the Magnolia Warbler to building a nest that requires the interlocking leaves or twigs of a conifer to hold it in place and only rarely permits it to anchor the nest in the vertical fork of a deciduous tree or shrub as the Redstart regularly does.

Behavior patterns may possibly be acquired in each generation by imitation and learning in a manner similar to that described by Cushing (1941, 1944) for mate preference and food habits. On the other hand, the behavior may involve definite patterns of nerve cells and connections that are as subject to modification, inheritance, and evolution as are any morphological features of the organism. The Black-throated Green Warbler appears locally to be breaking away from a nest-building behavior pattern similar to that of the Magnolia Warbler and to be acquiring the ability to build in semi-vertical forks that permits it to inhabit deciduous forests. It is impossible to be certain at the present time whether such a modification in behavior

represents a definite mutation or whether it is a change in 'tradition' that is passed on to each succeeding generation through conditioning the young in favor of a particular set of environmental factors. Similarly it is uncertain whether a difference in tolerance to light or a difference in behavior patterns evolved in the past for some other reasons explains the occurrence of Chestnut-sided Warblers only in open situations and the Black-throated Blue Warblers only within the forest, although both species build nests in forks of bushes or plants close to the ground.

It is possible that some behavior patterns have arisen merely through chance performing of an act over several generations in a particular way without any special benefit being thereby derived (Lack, 1940), but to have a behavior pattern become stereotyped so that succeeding generations perform in the same way with little modification would seem to require some advantage to the species and to be subject to the regular processes of evolution. These advantages may include the avoidance of unfavorable physical factors, such as extremes of climate, or the establishment of better biotic inter-relations.

The avoidance of excessive and continuous strife with competitors requiring similar feeding areas, nesting material, nest-sites, and song posts, must be a potent factor in successful reproduction and in evolution. Occupancy of a new unfilled niche within the same community or in another community may well proceed along with the differentiation of the race or species itself. As is well known, diversification in niche requirements reduces interspecific competition and permits a greater and more varied population to inhabit an area. The warblers are so prominent in the mixed evergreen-deciduous forest because they fill so many of these diverse niches: top level of evergreen trees (Blackburnian), middle level of usually evergreen trees (Black-throated Green), low level of evergreen trees (Magnolia), secondary deciduous growth (Redstart), tree trunks (Black and White), shaded shrubs (Black-throated Blue), sunlit shrubs (Chestnut-sided), wet shaded ground (Canada), wet sunlit ground (Yellow-throat), dry shaded ground (Oven-bird), dry sunlit ground (Nashville). Establishment of behavior patterns that are passed on by inheritance or by tradition insures that the offspring of each generation will automatically utilize the niche to which it belongs and thereby avoid the conflict and wastage of energy and time that would be necessitated were the assignment to niches within the community independently worked out by each generation. Behavior patterns once established are slow to change, as are anatomical or functional features, but they do change, for witness the Black-throated Green Warbler invading the deciduous

forest in the mountains. Behavior patterns have seemingly evolved to stabilize these adjustments and maintain the species' position within the community from generation to generation with the greatest economy and efficiency of effort.

SUMMARY AND CONCLUSIONS

1. Community selection by birds of shrubby fields or forests rather than grassland is correlated with the use of elevated positions for song-posts, nest-sites, or feeding areas.

2. Selection of forests rather than shrubby fields or grassland is correlated with the avoidance of high light intensity and with a greater restriction of free movement.

3. Preference for either evergreen or deciduous forest is correlated primarily with the size and shape of the leaves and with their arrangement on the twig rather than with differences in persistence of the foliage, in food supply, or in micro-climate. This preference is effected in different species through choice of material used in nest construction, in choice of nest-site, or in manner of feeding.

4. The avoidance or reduction of interspecific competition is an important factor in the evolutionary development of a preference for a particular niche.

5. Behavior patterns stabilize through succeeding generations the local segregation of species into different communities and their positions within these communities.

LITERATURE CITED

BLAKE, IRVING HILL

1926. A comparison of the animal communities of coniferous and deciduous forests. Ill. Biol. Mono., 10: 1-143.

BRECHER, LEONARD C.

1943. The relation of vegetational life forms to the distribution of breeding birds. Kentucky Warbler, 19: 41-49.

BROOKS, MAURICE

1940. The breeding warblers of the central Allegheny Mountain region. Wilson Bull., 52: 249-266.

BURLEIGH, THOS. D.

1927. Further notes on the breeding birds of northeastern Georgia. Auk, 44: 229-234.

CHAPMAN, FRANK M.

1907. The warblers of North America. Pp. i-ix, 1-306 (N. Y.).

CUSHING, JOHN E., JR.

1941. Non-genetic mating preference as a factor in evolution. Condor, 43: 233-236.

1944. The relation of non-heritable food habits to evolution. Condor, 46: 265-271.

EATON, ELON HOWARD

1914. Birds of New York. Pt. 2, Land Birds, N. Y. St. Mus., Mem. 12: 1-719.

FORBUSH, EDWARD HOWE

1929. Birds of Massachusetts and other New England states. Pt. 3, pp. i-xlvi, 1-466. (Boston).

HANN, HARRY W.

1937. Life history of the Oven-bird in southern Michigan. *Wilson Bull.*, 49: 145-237.

KENDEIGH, S. CHARLES

1934. The role of environment in the life of birds. *Ecol. Mono.*, 4: 299-417.
1941. Birds of a prairie community. *Condor*, 43: 165-174.

LACK, DAVID

1933. Habitat selection in birds. *Jour. Animal Ecol.*, 2: 239-262.
1937. The psychological factor in bird distribution. *British Birds*, 31: 130-136.
1940. Habitat selection and speciation in birds. *British Birds*, 34: 80-84.

LACK, DAVID AND VENABLES, L. S. V.

1939. The habitat distribution of British woodland birds. *Jour. Animal Ecol.*, 8: 39-70.

MAYR, ERNST

1942. Systematics and the origin of species. Pp. i-xiv, 1-334. (Columbia Univ. Press.)

MCATEE, W. L.

1932. Effectiveness in nature of the so-called protective adaptation in the animal kingdom, chiefly as illustrated by the food habits of nearctic birds. *Smith. Misc. Coll.*, 85: 1-201.

MILLER, ALDEN H.

1942. Habitat selection among higher vertebrates and its relation to intraspecific variation. *Amer. Nat.*, 76: 25-35.

MOREAU, R. E.

1934. A contribution to tropical African bird-ecology. *Jour. Animal Ecol.*, 3: 41-69.
1935. A critical analysis of the distribution of birds in a tropical African area. *Jour. Animal Ecol.*, 4: 167-191.

MOUSLEY, HENRY

1924. A study of the home life of the Northern Parula and other warblers at Hatley, Stanstead County, Quebec, 1921-1922. *Auk*, 41: 263-288.

NICE, MARGARET MORSE

1931. A study of two nests of the Ovenbird. *Auk*, 48: 215-228.

NICHOLS, JOHN TREADWELL

1919. Problems suggested by nests of warblers of the genus *Dendroica*. *Auk*, 36: 225-228.

PALMGREN, PONTUS

1932. Zur Biologie von *Regulus r. regulus* (L.) und *Parus atricapillus borealis* Selys. *Acta Zool. Fennica*, 14: 1-113.

PETERSON, ROGER T.

1942. Life zones, biomes, or life forms? *Audubon Mag.*, 44: 21-30.

PITELKA, FRANK A.

1941. Distribution of birds in relation to major biotic communities. *Amer. Midl. Nat.*, 25: 113-137.

ROOT, OSCAR M.

1942. Wood Thrush nesting in the coniferous bogs of Canadian Zone. *Auk*, 59: 113-114.

SAUNDERS, ARETAS A.

1938. Studies of breeding birds in the Allegany State Park. *N. Y. St. Mus. Bull.*, 318: 1-160.

TODD, W. E. CLYDE

1940. Birds of western Pennsylvania. Pp. i-xv, 1-710. (Univ. Pittsburgh Press.)

TROTTER, SPENCER

1912. The faunal divisions of eastern North America in relation to vegetation. *Jour. Acad. Nat. Sci. Phil.* (2nd. Ser.), 15: 207-218.

WALLS, GORDON LYNN

1942. The vertebrate eye and its adaptive radiation. *Cranbrook Inst. Sci., Bull.* 19: i-xiv, 1-785.

*Department of Zoology
University of Illinois
Champaign, Illinois*

TWENTIETH SUPPLEMENT TO THE AMERICAN ORNITHOLOGISTS' UNION CHECK-LIST OF NORTH AMERICAN BIRDS¹

IN view of the existing commercial situation relating to the production of books, in which good grade paper is difficult to obtain and costs are high, it is still not practicable to issue a complete revision of the A. O. U. Check-List, though need for such a volume is fully recognized. The Council of the Union at the meeting held in New York City in October, 1944, instructed the Committee on Classification and Nomenclature to prepare a further supplement for publication in *The Auk* summarizing action of the Committee during the past year.

The report herewith includes cases that have been brought to attention to the close of the year 1944, and covers most of the changes in names, status, and new forms proposed to that time. A number are still under consideration for final decision.

In addition to the matters listed beyond, the Committee has given attention to various questions of procedure for the final manuscript, among which may be mentioned one important change under which geographic names, particularly in Latin America, will follow the official spelling in the country concerned since this is the generally accepted modern practice. Under this, for example, Lower California of earlier editions will become Baja California, and names like Belém and Perú will include an accent.

¹ The Nineteenth Supplement was published in *The Auk*, vol. 61, July, 1944, pp. 441-464.

Common names for subspecies will be retained, though some have advocated that they be dropped in view of the adoption of a common name for the species, as announced in the Nineteenth Supplement. Under this arrangement, those working with species may use only the species name if so desired, while others interested in the minor divisions will also have common names available as needed. It is the belief of the committee that the Check-List should be prepared to meet the needs of all groups so far as practicable.

References will be simplified by citing volume numbers for books and periodicals uniformly in Arabic, regardless of use at the source. In early writings Roman numerals were used almost universally, but as volumes increased, these tended to become cumbersome so that there was change to Arabic. In *The Auk*, for example, Roman numbers cover volumes I to LIII while Arabic has been used from volume 54 to the present. This is the modern tendency in most periodicals, making exact citation burdensome, particularly since it serves no purpose other than to stand as a mark of meticulous accuracy.

The page reference for each item in the following list is to the fourth edition of the Check-List. Ranges given for additional forms are general and will be amplified in the final text.

Committee	{	ALEXANDER WETMORE, Chairman
		HERBERT FRIEDMANN
		FREDERICK C. LINCOLN
		ALDEN H. MILLER
		JAMES L. PETERS
		ADRIAAN J. VAN ROSSEM
		JOSSELYN VAN TYNE

JOHN T. ZIMMER

Page

- 3 *Colymbus grisegena grisegena* Boddaert. RED-NECKED GREBE. [2a.] *Colymbus grisegena* Boddaert, Table Planch. Enlum., 1783, 55. (DAUBENTON, Planch. Enl. 931 = France.) Additional subspecies. Breeding from Holland to western Siberia, in winter to Mediterranean and Turkestan; specimen from the Sukkertoppen district, Greenland, recorded by Salomonsen, Medd. om Grønland, 93, no. 6, 1935, 15.

- ✓ 11 *Pterodroma arminjoniana* (Giglioli and Salvadori). SOUTH TRINIDAD PETREL. [98.2.] *Aestrelata arminjoniana* Giglioli and Salvadori, Atti Soc. Ital. Sci. Nat., 11, 1868, 452. (South Trinidad Island.) Additional species. Breeding on South Trinidad and Martin Vas, ranging in adjacent South Atlantic, casually to Northern Hemisphere; recorded as a stray at Carolina Center, 15 miles southeast of Ithaca, N. Y., by Allen, Univ. State New York Bull. to the Schools, 20, no. 13, March 15, 1934, 134-135. (Specimen in U. S. National Museum.)

Page

- ✓ 11 *Pterodroma cookii orientalis* Murphy. COOK'S PETREL. [98.3.] *Pterodroma cookii orientalis* Murphy, Amer. Mus. Nov., no. 370, September 6, 1929, 5. (200 miles west of Callao, Perú.) Additional form. Ranges in the eastern Pacific off Chile and Perú, also in North Pacific; recorded near Adak, Aleutian Islands, and between the Revilla Gigedo Islands and Cabo San Lucas, Baja California. See Murphy, Oceanic Birds South America, 2, 1936, 716.
- 13 *Oceanodroma furcata* becomes *Oceanodroma furcata furcata* because of an additional subspecies.
- 13 *Oceanodroma furcata plumbea* (Peale). SOUTHERN FORK-TAILED PETREL. [105a.] *Thalassidroma plumbea* Peale, U. S. Expl. Exped., 8, Mamm. and Ornith., 1848, 292. (Coast of Oregon.) Additional subspecies. Coast of Humboldt County, California, to Alexander Archipelago, Alaska. See Grinnell and Test, Condor, 41, 1939, 170-172.
- ✓ 16 *Fregatta tropica tropica* becomes *Fregatta tropica* as no subspecies is recognized, and the common name WHITE-BELLIED PETREL changes to BLACK-BELLIED STORM PETREL. See Murphy, Oceanic Birds South America, 2, 1936, 764-767.
- ✓ 33 *Plegadis guarauna* becomes *Plegadis mexicana* (Gmelin), from *Tantalus mexicanus* Gmelin, Syst. Nat., 1, pt. 2, 1789, 652. ("Novae Hispaniae" = México.) *Scolopax guarauna* Linnaeus formerly used applies to the Limpkin. See Hellmayr and Conover, Cat. Birds Amer., 1, no. 1, 1942, 301.
- ✓ 35 *Sthenelides* becomes a subgenus of *Cygnus* as it is not considered of full generic rank. *Sthenelides olor* therefore becomes *Cygnus olor* (Gmelin). See Peters, Check-list, 1, 1931, 144.
- 37 *Branta canadensis interior* Todd. UNGAVA CANADA GOOSE. [172e.] *Branta canadensis interior* Todd, Auk, 55, no. 3, Oct., 1938, 662. (Port Harrison, east coast of Hudson Bay, northern Quebec.) Additional subspecies. Breeds on east coast of Hudson and James Bays; in migration to southern United States, mainly west of the Appalachian Mountains.
- ✓ 40 *Anser fabalis* is dropped from the list as Greenland records are invalid. See Jourdain, Auk, 50, 1933, 202.
- 44 *Anas rubripes rubripes* becomes *Anas rubripes*, and *Anas rubripes tristis* is dropped. See Shortt, Wilson Bull., 55, 1943, 3-7, 1 colored plate.
- 46 *Anas acuta acuta* Linnaeus. OLD WORLD PINTAIL. [143a.] *Anas acuta* Linnaeus, Syst. Nat., ed. 10, 1, 1758, 126. (Sweden.) Additional subspecies. Breeds from Iceland across northern Europe and Siberia, southward in winter; casual at Point Barrow, Alaska. See Bailey, Brower and Bishop, Program of Activities Chicago Acad. Sci., 4, 1933, 21.
- ✓ 50 *Nyroca Fleming*, Phil. Zool., 2, subsequent to June 28, 1822, 260, becomes *Aythya* Boie, Tagebuch Reise Norwegen, before May, 1822, 351. Type, by monotypy, *Anas marila* Linnaeus. See Witherby, Jourdain, Ticehurst and Tucker, Handb. Brit. Birds, 3, 1939, 221, 286; B. O. U. Committee, Ibis, 1939, 522; Mathews, Emu, 38, 1939, 525-526. The names will be as follows:
- Aythya americana* (Eyton).
Aythya ferina (Linnaeus).
Aythya collaris (Donovan).
Aythya valisineria (Wilson).
Aythya marila (Linnaeus).
Aythya affinis (Eyton).
Aythya fuligula (Linnaeus).

Page

- ✓ 53-54 The genus *Charitonetta* is united with *Glaucionetta* so that the Buffle-head will be known as *Glaucionetta albeola* (Linnaeus). See Peters, Check-list, 1, 1931, 177.
- ✓ 59 *Nomonyx dominicus* is included in *Erismatura* and becomes *Erismatura dominica* (Linnaeus). See Bond, Birds West Indies, 1937, 44, footnote.
- 62 Genus *Sarcoramphus* Duméril. *Sarcoramphus* Duméril, Zool. Analytique, 1806, 32. Type, by subs. desig., *Vultur papa* Linnaeus (Vigors, 1825). Additional genus.
- ✓ 62 *Sarcoramphus papa* (Linnaeus). KING VULTURE. [326.1.] *Vultur Papa* Linnaeus, Syst. Nat., ed. 10, 1, 1758, 86. ("India occidentalis" = Surinam.) Additional species. Tropical America; recorded from the St. John's River, above Lake George, Florida, by William Bartram. See Harper, Auk, 53, 1936, 381-392.
- 69 *Buteo lagopus pallidus* (Menzbier). SIBERIAN ROUGH-LEGGED HAWK. [347b.] *Archibuteo pallidus* Menzbier, Orn. Turkestan, 1, 1888, 163. (Bugun River and Vernoy, Turkestan.) Additional subspecies. Northern Siberia, in winter from Transcaspia to northern Japan; breeding in northwestern Alaska. See Friedmann, Condor, 36, 1934, 246; Bailey, Auk, 59, 1942, 305-306.
- 69 *Parabuteo unicinctus superior* van Rossem. WESTERN HARRIS'S HAWK. [335a.] *Parabuteo unicinctus superior* van Rossem, Trans. San Diego Soc. Nat. Hist., 9, no. 33, February 17, 1942, 377. (Laguna Dam, Lower Colorado River, Imperial County, California.) Additional subspecies. South-eastern California and southern Arizona to Baja California, and Sinaloa.
- 75 *Falco peregrinus calidus* Latham. SIBERIAN PEREGRINE FALCON. [356c.] *Falco calidus* Latham, Index Orn., 1, 1790, 41. (India.) Additional subspecies. Northern Siberia, in winter to France, northern Africa, India and Japan; accidental in Alaska. See Hanna, Condor, 42, 1940, 166.
- 76 *Falco columbarius subaesalon* Brehm. ICELAND MERLIN. [358.1a.] From *Falco subaesalon* Brehm, Ornis, 3, 1827, 9. (Iceland.) Iceland, in migration to British Isles; female recorded from Angmagssalik, Greenland, about July 3, 1914. See Schiøler, Danmarks Fugle, 3, 1931, 325, 336, 338; Jourdain, in Bent, U. S. Nat. Mus., Bull. 170, 1938, 90.
- 77 *Falco sparverius phalaena* included as a synonym of *Falco sparverius sparverius*. See Wetmore, Proc. U. S. Nat. Mus., 89, 1941, 534; Bond, Condor, 45, 1943, 172-176, 184.
- 77 *Falco sparverius guadalupensis* Bond. GUADALUPE SPARROW HAWK. (360d.) *Falco sparverius guadalupensis* R. M. Bond, Condor, 45, September 24, 1943, 179. (Guadalupe Island, Baja California.) Additional subspecies. Guadalupe Island, Baja California.
- 78 *Ortalis vetula vetula* (Wagler) becomes *Ortalis vetula mcalli* Baird, from *Ortalis McCalli* Baird, in Baird, Cassin and Lawrence, Rep. Expl. Surv. Pac. R. R., 9, 1858, 611. (Boquilla, Nuevo León.) See van Rossem, Trans. San Diego Soc. Nat. Hist., 7, 1934, 347; Hellmayr and Conover, Cat. Birds Amer., 1, no. 1, 1942, 169.
- 81 *Bonasa umbellus incanus* Aldrich and Friedmann. HOARY RUFFED GROUSE. [300g.] *Bonasa umbellus incanus* Aldrich and Friedmann, Condor, 45, May 24, 1943, 99. (Barclay, 15 miles east of Salt Lake City, Utah.) Additional subspecies. Utah and Colorado to southern Manitoba and North Dakota.

Page

- 83 *Lagopus mutus captus* Peters. EAST GREENLAND ROCK PTARMIGAN. [302i.] *Lagopus mutus captus* Peters, Check-list Birds of the World, 2, 1934, 35. (New name for *L. m. groenlandicus* Schiøler, preoccupied.) Additional subspecies. Eastern Greenland.
- 84 *Lagopus mutus gabrielsoni* Murie. AMCHITKA ROCK PTARMIGAN. [302j.] *Lagopus mutus gabrielsoni* Murie, Condor, 46, no. 3, May 24, 1944, 121. (Amchitka Island, Aleutian Islands, Alaska.) Additional subspecies. Amchitka, Little Sitkin and Rat Islands; Semisopochnoi Island?
- 85 *Lagopus leucurus saxatilis* Cowan. VANCOUVER WHITE-TAILED PTARMIGAN. [304d.] *Lagopus leucurus saxatilis* Cowan, Condor, 41, no. 2, March 15, 1939, 82. (6000 feet elevation on Mount Arrowsmith, Vancouver Island, British Columbia.) Additional subspecies. Higher peaks of Vancouver Island.
- 86 *Pedioecetes phasianellus caurus* Friedmann. ALASKA SHARP-TAILED GROUSE. [308d.] *Pedioecetes phasianellus caurus* Friedmann, Journ. Washington Acad. Sci., 33, no. 6, June 15, 1943, 190. (Fairbanks, Alaska.) Additional subspecies. North-central Alaska to southern Yukon and northeastern Alberta.
- ✓ 94 *Aramus pictus pictus* becomes *Aramus guarauna pictus* (Meyer). See Hellmayr and Conover, Cat. Birds Amer., 1, no. 1, 1942, 301, 307.
- 95 Subfamily RALLINAE reinstated.
- ✓ 103 *Charadrius melodus circumcinctus* (Ridgway). BELTED PIPING PLOVER. [277a.] *Aegialitis melodus* var. *circumcinctus* Ridgway, Amer. Nat., 8, no. 2, February, 1874, 109. (Loup Fork of Platte River, Nebraska.) Reinstated. See Moser, Nebraska Bird Review, 10, 1942, 31-37, 5 figs.; Burleigh, Occ. Papers Mus. Zool. Louisiana State Univ., no. 20, 1944, 367-368.
- ✓ 109 *Scolopax rusticola rusticola* becomes *Scolopax rusticola* as no subspecies is recognized. See Taka-Tsukasa and Hachisuka, Ibis, 1925, 903; Witherby, Jourdain, Ticehurst and Tucker, Handb. Brit. Birds, 4, 1940, 184, 192.
- ✓ 110 *Capella delicata* becomes *Capella gallinago delicata* as it considered a subspecies of the Old World form. See Witherby, Jourdain, Ticehurst and Tucker, Handb. Brit. Birds, 4, 1940, 204-205.
- 112 *Numenius phaeopus variegatus* (Scopoli). SIBERIAN WHIMBREL. [267a.] *Tantalus variegatus* Scopoli, Del. Flor. Faun. Insubr., fasc. 2, 1786, 92. (Luzon.) Breeds in eastern Siberia, in migration to Australia and Caroline Islands; accidental at Barrow, Alaska. See Bailey, Auk, 54, 1939, 333.
- 117 *Calidris canutus canutus* (Linnaeus). OLD WORLD KNOT. [234a.] *Tringa canutus* Linnaeus, Syst. Nat., ed. 10, 1, 1758, 149. (Europe = Sweden.) Additional subspecies. Breeds from northwestern Greenland across Siberia to Point Barrow, Alaska, in migration to Europe, Asia, and Pacific coast of North America. See Conover, Condor, 45, 1943, 226-228.
- 118 *Erolia philocephalus tschuktschorum* (Portenko). [235d.] NORTHERN ALEUTIAN SANDPIPER. *Arquatella maritima tschuktschorum* Portenko, Mitt. Zool. Mus. Berlin, 22, October 30, 1937, 225. ("Terrae Tschuktschorum" = Uelen, Chukchee Peninsula.) Additional subspecies. Breeds in Siberia (Emma Harbor), St. Lawrence and Nunivak Islands, and Wales, Alaska, in winter south to Washington and Oregon. See Conover, Field Mus. Nat. Hist., Zool. Ser., 29, no. 11, 1944, 174.
- 121 *Erolia alpina arctica* Schiøler. GREENLAND DUNLIN. [243b.] *Erolia alpina arctica* Schiøler, Dansk. Orn. For. Tidsskr., 16, May, 1922, 19. (East

Page

- coast of Greenland.) Additional subspecies. Breeds in eastern Greenland; recorded from Massachusetts. See Griscom, Auk, 54, 1937, 70-72.
- 130 *Catharacta skua antarctica* (Lesson). FALKLAND SKUA. [35a.] *Lestris antarcticus* Lesson, *Traité d'Orn.*, livr. 8, 1831, 616. (Falkland Islands.) Additional subspecies. Breeds on Falkland Islands, ranging northward; recorded from coast of Washington. See Alcorn, Condor, 44, 1942, 218-221.
- 130 *Catharacta skua lönnerbergi* Mathews. BROWN SKUA. [35b.] *Catharacta antarctica lönnerbergi* Mathews, Nov. Zool., 18, no. 3, January 31, 1912, 212. (New Zealand seas.) Additional subspecies. Circumpolar in Antarctic regions, except for area of *C. s. antarctica*, ranging northward; recorded from coast of Washington. See Alcorn, Condor, 44, 1942, 218-221.
- ✓ 130 *Larus hyperboreus* becomes *Larus hyperboreus hyperboreus* because of an additional subspecies. G
- 130 *Larus hyperboreus barrovianus* Ridgway. POINT BARROW GULL. [42.1.] *Larus barrovianus* Ridgway, Auk, 3, no. 3, July, 1886, 330. (Point Barrow, Alaska.) Restored to list as a race of *hyperboreus*. See Rand, Canadian Field-Nat., 56, 1942, 123, 126.
- ✓ 130 *Larus leucopterus* becomes *Larus leucopterus leucopterus* because of recognition of a subspecies.
- 130 *Larus leucopterus kumlieni* Brewster, KUMLIEN'S GULL. [45.] *Larus kumlieni* Brewster, Bull. Nutt. Orn. Club, 8, no. 4, October, 1883, 216. (Cumberland Sound, Arctic America.) Reinstated as a subspecies of *Larus leucopterus*. See Rand, Can. Field-Nat., 56, 1942, 124, 126; Bishop, Field Mus. Nat. Hist., Zool Ser., 29, 1944, 186.
- ✓ 137 *Xema sabini* becomes *Xema sabini sabini* because of an additional subspecies.
- 137 *Xema sabini woznesenskii* Portenko. SOUTHERN SABINE'S GULL. [62a.] *Xema sabini woznesenskii* Portenko, Ibis, ser. 14, 3, no. 2, April, 1939, 268. (Hooper Bay, Alaska.) Additional subspecies. Breeding in the Bering Sea area (specimens examined from American localities only), in migration to Baja California.
- 140 *Sterna albifrons althalassos* Burleigh and Lowery. INTERIOR LEAST TERN. [74b.] Occ. Papers Mus. Zool. Louisiana State Univ., no. 10, March 4, 1942, 173. (St. Francisville, West Feliciana Parish, Louisiana.) Additional subspecies. Lower Mississippi River Valley, north to Iowa, Ohio, southwestern Kansas and Nebraska.
- ✓ 141 *Hydroprogne caspia imperator* becomes *Hydroprogne caspia* (Pallas) as no subspecies is recognized. From *Sterna caspia* Pallas, Novi Comm. Acad. Petr., 14 (1), 1770, 582, pl. 22. (Caspian Sea, South Russia.) See Witherby, in Witherby, Jourdain, Ticehurst and Tucker, Handb. Brit. Birds, 5, 1941, 18.
- ✓ 144 *Alca torda* becomes *Alca torda torda* because of an extralimital form. See Witherby, Jourdain, Ticehurst and Tucker, Handb. Brit. Birds, 5, 1941, 142-149.
- 145 *Uria aalge inornata* Salomonsen. NORTH PACIFIC MURRE. [30b.] *Uria aalge inornata* Salomonsen, Ibis, ser. 13, 11, January, 1932, 128. (St. Matthew Island, Alaska.) Additional subspecies. Breeding from Yezo and Washington north into Bering Sea.
- ✓ 145 *Plautus alle* becomes *Plautus alle alle* through recognition of an extralimital subspecies. See Witherby, Jourdain, Ticehurst and Tucker, Handb. Brit. Birds, 5, 1941, 165-168.

Page

- 152 *Columba fasciata monilis* Vigors. WESTERN BAND-TAILED PIGEON. [312b.] *Columba monilis* Vigors, Zool. Beechey's Voy., 1839, 26, pl. 10. (Monterey, California.) Additional subspecies. Pacific coast from British Columbia to California. See Brodtkorb, Condor, 45, 1943, 19.
- ✓ 157 *Oreopeleia montana* becomes *Oreopeleia montana montana* because of recognition of extralimital subspecies. See Bond, Birds West Indies, 1936, 158; Hellmayr and Conover, Cat. Birds Amer., 1, no. 1, 1942, 602.
- 159 Subfamily PHAENICOPHAEINAE added for Genus *Coccyzus*. See Peters, Check-list, 4, 1940, 41.
- 167 *Glaucidium gnoma gnoma* Wagler. MEXICAN PYGMY OWL. [379d.] *Glaucidium gnoma* Wagler, Isis, 1832, 275. (México.) Additional subspecies. Tableland of México; north to the Huachuca, Atasco and Santa Rita Mountains, Arizona. See van Rossem, Trans. San Diego Soc. Nat. Hist., 8, 1936, 131-132.
- 170 *Strix nebulosa barbata* is dropped as Friedmann and Wetmore find that the record is based on erroneous identification of a pale example of *Strix nebulosa nebulosa*.
- 174 *Phalaenoptilus nuttallii adustus* van Rossem. SONORA POOR-WILL. [418e.] *Phalaenoptilus nuttallii adustus* van Rossem, Condor, 43, no. 5, September 18, 1941, 247. (Bates Well, Pima County, Arizona, altitude 1500 feet.) Additional subspecies. Southern Arizona to Sonora.
- 176 *Chordeiles minor gundlachii* Lawrence. CUBAN NIGHTHAWK. [420g.] *Chordeiles gundlachii* Lawrence, Ann. Lyc. Nat. Hist. New York, 6, December, 1856, 165. (Cuba.) Additional subspecies. Greater Antilles, north to Florida Keys. See Greene, Auk, 60, 1943, 105.
- ✓ 178 *Chaetura vauxi* becomes *Chaetura vauxi vauxi* because of extralimital subspecies. See Griscom, Bull. Amer. Mus. Nat. Hist., 64, 1932, 196; Sutton, Wilson Bull., 1941, 231-233.
- 184 *Hylocharis leucotis leucotis* becomes *Hylocharis leucotis borealis* Griscom, Amer. Mus. Nov., no. 379, October 17, 1929, 10. (Pinos Altos, Chihuahua.) See van Rossem, Bull. Mus. Comp. Zool., 77, 1934, 441.
- 186 *Chloroceryle americana leucosticta* van Rossem and Hachisuka, 1938, is preoccupied by *Chloroceryle leucosticta* Reichenbach, 1851, and, therefore, is renamed *Chloroceryle americana hachisukai* (Laubmann). *Ceryle americana hachisukai* Laubmann, Verh. Orn. Ges. Bayern, 22, 1940, 165.
- 188 *Colaptes cafer nanus* Griscom. DWARF RED-SHAFTED FLICKER. [413c.] *Colaptes cafer nanus* Griscom, Bull. Mus. Comp. Zool., 75, no. 10, January, 1934, 381. (Irina, San Luis Potosí, México.) Additional subspecies. San Luis Potosí and Tamaulipas, north to Brewster County, Texas. See Van Tyne and Sutton, Univ. Michigan Mus. Zool. Misc. Publ., no. 37, August 24, 1937, 46.
- 188 *Colaptes cafer sedentarius* van Rossem. SANTA CRUZ RED-SHAFTED FLICKER. [413d.] *Colaptes cafer sedentarius* van Rossem, Condor, 46, no. 5, September 27, 1944, 245. (Prisoner's Harbor, Santa Cruz Island, California.) Additional subspecies. Santa Cruz Island, California.
- ✓ 190 *Centurus carolinus zebra* (Boddaert). WESTERN RED-BELLIED WOODPECKER. [409a.] From *Picus zebra* Boddaert, Tabl. Planch. Enl., 1783, 43. (Based on Epeiche ou Pic rayé de la Louisiane, Daubenton, Pl. Enl., pl. 692, type locality designated as Baton Rouge, Louisiana.) Additional subspecies.

Page

- Mississippi Valley east to Ohio. See Burleigh and Lowery, Occ. Papers Mus. Zool. Louisiana State Univ., no. 17, 1944, 297.
- 190 *Centurus carolinus perplexus* Burleigh and Lowery. FLORIDA RED-BELLIED WOODPECKER. [409b.] *Centurus carolinus perplexus* Burleigh and Lowery, Occ. Papers Mus. Zool. Louisiana State Univ., no. 17, December 30, 1944, 298. (Cape Sable, near Flamingo, Monroe County, Florida.) Additional subspecies. Lower Florida Peninsula and Florida Keys.
- ✓ 190 *Centurus aurifrons* becomes *Centurus aurifrons aurifrons* as it is conspecific with extralimital forms. See Wetmore, Proc. U. S. Nat. Mus., 93, 1943, 274.
- 190 *Centurus uropygialis albescens*. COLORADO RIVER GILA WOODPECKER. [411c.] *Centurus uropygialis albescens* van Rossem, Condor, 44, January 15, 1942, 22, fig. 8. (Laguna Dam, lower Colorado River, Imperial County, California.) Additional subspecies. Southern Nevada to northwestern Sonora and northeastern Baja California.
- 191 *Balanosphyra formicivora aculeata* is united with *Balanosphyra formicivora formicivora*. See van Rossem, Bull. Mus. Comp. Zool., 77, 1934, 444.
- ✓ 199 *Dryobates borealis* becomes *Dryobates borealis borealis* because of an additional subspecies.
- 199 *Dryobates borealis hylonomus* Wetmore. SOUTHERN RED-CKEADED WOODPECKER. [395a.] *Dryobates borealis hylonomus* Wetmore, Proc. U. S. Nat. Mus., 90, October 31, 1941, 498. (7 miles southwest of Kissimmee, Florida.) Additional subspecies. Central and southern Florida.
- 202 *Tyrannus melancholicus couchi* becomes *Tyrannus melancholicus couchii*, to conform with original spelling.
- 203 *Muscivora tyrannus sanctaemartae* Zimmer. SANTA MARTA FORK-TAILED FLYCATCHER. [442a.] *Muscivora tyrannus sanctaemartae* Zimmer, Amer. Mus. Nov., no. 962, November 18, 1937, 7, fig. 1. (Bonda, Departamento Magdalena, Colombia.) Additional subspecies. Santa Marta region, Colombia; casual in New Jersey. See Bond, Auk, 57, 1940, 418.
- 205 *Myiarchus nuttingi inquietus* Salvin and Godman. GUERRERO FLYCATCHER. [453.1.] *Myiarchus inquietus* Salvin and Godman, Biol. Centr.-Amer., Aves, 2, pt. 74, March, 1889, 88. ("Acaguisotla" = Acahuizotla, Guerrero.) Additional species. Sonora and Chihuahua to Chiapas; recorded from Cataviña, N. Lat. 29° 46', Baja California. See Huey, Auk, 48, 1931, 429-430.
- 206 *Sayornis nigricans nigricans* becomes *Sayornis nigricans semiatra* (Vigors), from *Muscicapa semiatra* Vigors, Zool. Voy. Blossom, 1839, 17. (Monterey, California.) See van Rossem, Trans. San Diego Soc. Nat. Hist., 6, 1931, 263.
- 206 *Sayornis nigricans brunescens* and *Sayornis nigricans salictaria* are united with *Sayornis nigricans semiatra*. See Swarth, Proc. California Acad. Sci. ser. 4, 18, no. 12, April 26, 1929, 307; van Rossem, Trans. San Diego Soc. Nat. Hist., 6, 1931, 263.
- 207 *Sayornis saya yukonensis* Bishop. YUKON PHOEBE. [457b.] *Sayornis saya yukonensis* Bishop, Auk, 18, no. 2, April, 1900, 115. Additional subspecies. (Glacier, White Pass, Alaska.) Yukon, southeastern Alaska and northern British Columbia, in winter to California and Texas. See Hellmayr, Cat. Birds Amer., 5, 1927, 59-60; Burleigh and Lowery, Occ. Pap. Mus. Zool. Louisiana State Univ., no. 8, 1940, 110-111.
- ✓ 208 *Empidonax hammondi* becomes *Empidonax hammondii* to conform with original spelling.

Page

- ✓ 209 *Empidonax wrightii* becomes *Empidonax wrightii* to conform with original spelling.
- ✓ 211 *Nuttallornis mesoleucus* becomes *Nuttallornis borealis* (Swainson), from *Tyrannus borealis* Swainson, Fauna Bor.-Amer., 2, 1831 (February, 1832), 141, pl. 35. ("Cumberland House" = Carlton House, Saskatchewan.) See van Rossem, Trans. San Diego Soc. Nat. Hist., 7, 1934, 350-352.
- 213 *Otocoris alpestris alpina* Jewett. ST. HELENS HORNED LARK. [474s.] *Otocoris alpestris alpina* Jewett, Auk, 60, no. 2, April, 1943, 262. (Arctic Alpine zone of Mt. St. Helens, Skamania County, Washington.) Additional subspecies. Arctic Alpine Zone of Mt. St. Helens and Mt. Rainier, Washington, possibly north into British Columbia.
- 214 *Otocoris alpestris sierrae* Oberholser. SIERRA NEVADA HORNED LARK. [474s.] *Otocoris alpestris sierrae* Oberholser, Condor, 22, January 26, 1920, 34. (Head of Pine Creek, Lassen County, California.) Additional subspecies. Northern Sierra Nevada and southern Cascade Mountains, California. See Behle, Univ. California Publ. Zool., 46, 1942, 246-252.
- 216 *Riparia riparia ijimae* (Lönnerberg). KAMCHATKA BANK SWALLOW. [166a.] *Clivicola riparia ijimae* Lönnerberg, Journ. Coll. Sci. Imp. Univ. Tokyo, 23, art. 14, 1908, 38. (Tretia Padi, Sakhalin Island.) Additional subspecies. Kamchatka to Sakhalin, the Kuriles and Japan; recorded from Point Barrow, Alaska. See Bailey, Auk, 46, 1929, 550-551; Huey, Auk, 55, 1938, 556.
- 217 *Stelgidopteryx ruficollis psammochrous* Griscom. SONORA ROUGH-WINGED SWALLOW. [617a.] *Stelgidopteryx serripennis psammochrous* Griscom, Proc. New England Zool. Club, 11, December 14, 1929, 72. (Oposura, Sonora.) Additional subspecies. Guerrero to Texas, southern Arizona and southern California. See Wetmore, Proc. U. S. Nat. Mus., 86, 1939, 202-203; Brod-korb, Condor, 44, 1942, 215-216.
- 217 *Hirundo rustica gutturalis* Scopoli. AMUR BARN SWALLOW. [613a.] *Hirundo gutturalis* Scopoli, Del. Flor. Faun. Insubr., 2, 1786, 96. (Antigua, Panay, Philippine Islands.) Additional subspecies. Amur and Ussuriland to Korea and Japan; casual at St. Lawrence Island and Point Barrow, Alaska. See Friedmann, Condor, 41, 1939, 37.
- 218 *Petrochelidon pyrrhonota melanogaster* becomes *Petrochelidon pyrrhonota minima* van Rossem and Hachisuka, Trans. San Diego Soc. Nat. Hist., 9, no. 2, November 21, 1938, 5. ("Pichicuate" = Cuchujaqui River, 7 miles east of Álamos, Sonora.) (*Petrochelidon p. melanogaster* is now restricted to central and southern México.)
- 218 *Petrochelidon pyrrhonota hypopolia* Oberholser. GREAT BASIN CLIFF SWALLOW. [612c.] *Petrochelidon lunifrons hypopolia* Oberholser, Can. Field-Nat., 33, Nov., 1919 (Jan. 3, 1920), 95. (Fort Norman, Mackenzie.) Additional subspecies. Great Basin south to Mono County, California, in migration to Central America.
- 221 *Perisoreus canadensis pacificus* A. H. Miller. PACIFIC CANADA JAY. [484g.] *Perisoreus canadensis pacificus* A. H. Miller, Condor, 45, no. 3, May 24, 1943, 117. (Mount Brilliant, 5000 feet elevation, Rainbow Mountains, north of Bella Coola River, Coast District, British Columbia.) Additional subspecies. Rainbow Mountain area, headwaters of Dean and Bella Coola Rivers, central coast range, British Columbia.

Page

- 222 *Cyanocitta stelleri percontatrix* van Rossem. NEVADA CRESTED JAY. [478f.] *Cyanocitta stelleri percontatrix* van Rossem, Trans. San Diego Soc. Nat. Hist., 6, no. 22, June 5, 1931, 328. (8500 feet elevation, Hidden Forest, Sheep Mountains, Clark County, Nevada.) Additional subspecies. Sheep and Charleston Mountains, Clark County, Nevada.
- 223 *Aphelocoma coerulescens immanis* becomes *Aphelocoma coerulescens superciliosa* (Strickland), from *Cyanocitta superciliosa* Strickland, Ann. Mag. Nat. Hist., ser. 1, 15, April, 1845, 261. ("California" = Sacramento Valley.) See van Rossem, Trans. San Diego Soc. Nat. Hist., 7, no. 29, November 22, 1933, 345-346.
- 223 *Aphelocoma coerulescens cactophila* Huey. DESERT CALIFORNIA JAY. [481e.] *Aphelocoma californica cactophila*, Huey, Trans. San Diego Soc. Nat. Hist., 9, no. 35, October 1, 1942, 432. (3 miles north of Punta Prieta, Baja California, 28° 56' n. lat., 114° 12' w. long.) Additional subspecies. Baja California from 29° 20' n. lat., south to Mulejé on the Gulf coast, and to 25° 40' n. lat. on the Pacific slope.
- 226 *Corvus corax clarionensis* Rothschild and Hartert. SOUTHWESTERN RAVEN. [486b.] *Corvus corax clarionensis* Rothschild and Hartert, Nov. Zool., 9, July 25, 1902, 381. (Clarion Island, Revilla Gigedo Islands, México.) Additional subspecies. Southwestern California to northwestern México. See Willett, Auk, 58, 1941, 246-249.
- ✓ 227 *Corvus brachyrhynchos caurinus* becomes *Corvus caurinus*. See Brooks, Pac. Coast Avifauna, no. 17, 1925, 81; Amadon, Amer. Mus. Nov., no. 1251, 1944, 15.
- 229 *Parus atricapillus bartletti* (Aldrich and Nutt). NEWFOUNDLAND BLACK-CAPPED CHICKADEE. [735f.] *Penthestes atricapillus bartletti* Aldrich and Nutt, Scient. Publ. Cleveland Mus. Nat. Hist., 4, no. 2, December 28, 1939, 29. (Makinson's Grove, Avalon Peninsula, eastern Newfoundland.) Additional subspecies. Newfoundland. (The proposal of van Rossem, Auk, 59, 1942, 312-313, to use *Parus frigoris* de Selys-Longchamps, Bull. Acad. Roy. Sci. Bruxelles, 10, 1843, 27, for this race requires a check by actual comparison with Newfoundland birds.)
- 232 *Parus hudsonicus cascadiensis* A. H. Miller. CASCADE BROWN-HEADED CHICKADEE. [740c.] *Parus hudsonicus cascadiensis* A. H. Miller, Occ. Papers Mus. Zool. Louisiana State Univ., no. 14, November 22, 1943, 262. (1 mile south of Monument 83, long. 120°, 38½', on the United States-Canadian boundary, 6,000 feet elevation, Okanogan County, Washington.) Additional subspecies. Northern Cascade Mountains, Washington.
- 237 *Sitta carolinensis mexicana* Nelson and Palmer. MEXICAN WHITE-BREASTED NUTHATCH. [727g.] *Sitta carolinensis mexicana* E. W. Nelson and T. S. Palmer, Auk, 11, no. 1, January, 1894, 45. (Mount Orizaba, Puebla.) Additional subspecies. Highlands of Mexico from Oaxaca to Nayarit and southern Chihuahua, north to the Chisos Mountains, Texas. (*Sitta carolinensis oberholseri* Brandt, Auk, 55, 1938, 269, is a synonym.)
- 242 *Cinclus mexicanus mexicanus* Swainson. MEXICAN DIPPER. [701a.] *Cinclus mexicanus* Swainson, Phil. Mag., n. s., 2, May, 1827, 368. (Temascáltepec, México.) Additional subspecies. Oaxaca north through México to the Huachuca Mountains, Arizona. See Blake, Auk, 59, 1942, 578-579.

Page

- 243 *Troglodytes troglodytes stevensoni* (Oberholser). STEVENSON'S WINTER WREN. [722g.] *Nannus troglodytes stevensoni* Oberholser, Proc. Biol. Soc. Washington, 43, September 26, 1930, 151. (Amak Island, Alaska.) Additional subspecies. Amak and Amagat Islands, Alaska.
- 244 *Thryomanes bewickii altus* Aldrich. APPALACHIAN BEWICK'S WREN. [719.1.] Occ. Papers Mus. Zool. Louisiana State Univ., no. 18, December 30, 1944, 307. (7 miles east of Philippi, Barbour County, West Virginia.) Additional subspecies. Pennsylvania and central Ohio to Alabama and western North Carolina.
- ✓ 246 *Thryomanes brevicauda* becomes *Thryomanes bewickii brevicauda*. See Hellmayr, Cat. Birds Amer., 7, 1934, 214.
- 247 *Thryothorus ludovicianus burleighi* Lowery. BURLEIGH'S CAROLINA WREN. [718c.] *Thryothorus ludovicianus burleighi* Lowery, Auk, 47, no. 1, January, 1940, 99. (Cat. Island, nine miles offshore from Gulfport, Mississippi.) Additional subspecies. Cat, Ship and Horn Islands, Mississippi.
- 248 *Telmatodytes palustris dissaëptus* (Bangs) becomes *Telmatodytes palustris iliacus* Ridgway, from *Telmatodytes palustris iliacus* Ridgway, Proc. Biol. Soc. Washington, 16, September 30, 1903, 110. (Wheatland, Knox County, Indiana.) See Todd, Proc. Biol. Soc. Washington, 50, 1937, 23.
- 250 *Salpinctes obsoletus tenuirostris* van Rossem. SAN BENITO ROCK WREN. [715a.] *Salpinctes obsoletus tenuirostris* van Rossem, Condor, 45, no. 6, December 8, 1943, 236. (West San Benito Island, Baja California.) Additional subspecies. San Benito Islands, Baja California.
- 253 *Toxostoma curvirostre curvirostre* (Swainson) becomes *Toxostoma curvirostre celsum* Moore. *Toxostoma curvirostre celsum* Moore, Proc. Biol. Soc. Washington, 54, December 8, 1941, 212. (Laguna Juanota, elevation more than 9000 feet, southwest Chihuahua.) Chiricahua Mountains, southeastern Arizona and southern New Mexico to northwestern Guanajuato and northeastern Jalisco.
- ✓ 256 *Turdus pilaris* Linnaeus. FIELDFARE. [761.2.] *Turdus pilaris* Linnaeus, Syst. Nat., ed. 10, 1, 1758, 168. (Sweden.) Additional species. Northern Europe and Siberia, south in winter to central and southern Europe, Palestine and India; accidental on Jens Munk Island, Foxe Basin, Arctic America and in Greenland. See Taverner, Auk, 57, 1940, 119; and Oldenow, Fugeliv i Grønland, Grønlands Selshab Aarskrift, 1932-1933, 185, illustr., who records a Fieldfare taken February 24, 1925, and preserved in Greenland College Museum at Godthaab, Greenland.
- 260 *Hylocichla fuscescens fuliginosa* Howe. NEWFOUNDLAND VEERY. [756b.] *Hylocichla fuscescens fuliginosa* R. H. Howe, Jr., Auk, 17, no. 3, July, 1900, 271. (Codroy, Newfoundland.) Additional subspecies. Breeding in Newfoundland; winter range uncertain, See Burleigh, Occ. Papers Mus. Zool. Louisiana State Univ., no. 20, 1944, 427.
- ✓ 262 *Cyanosylvia suecica* becomes *Cyanosylvia suecica robusta* (Buturlin). *Cyanecula suecica robusta* Buturlin, Orn. Monatsber., 15, no. 5, May, 1905, 79. (Kolyma Delta, northeastern Siberia.) Eastern Siberia from the Taimyr Peninsula to Kamchatka and western Alaska.
- 265 *Poliophtila melanura lucida*, van Rossem. SONORA GNATCATCHER. [752c.] *Poliophtila melanura lucida* van Rossem, Condor, 33, no. 1, January 15, 1931, 36. (10 miles north of Guaymas, Sonora.) Additional subspecies. Central Sonora to southern Arizona and southeastern California.

Page

- 265 *Poliioptila melanura pontilis* van Rossem. SAN FRANCISQUITO GNATCATCHER. [752d.] *Poliioptila melanura pontilis* van Rossem, Proc. Biol. Soc. Washington, 44, July 15, 1931, 99, new name for *P. m. nelsoni* van Rossem, Condor, 33, 1931, 35, preoccupied by *Poliioptila nelsoni* Ridgway, 1903. (San Francisquito Bay, Baja California.) Additional subspecies. Central Baja California.
- 266 *Corthylio* is listed as a subgenus under *Regulus*.
- ✓ 269 *Anthus gustavi* Swinhoe. PETCHORA PIPIT. [698.1.] *Anthus gustavi* Swinhoe, Proc. Zool. Soc. London, May, 1863, 90. (Amoy.) Additional species. Commander Islands and Kamchatka to northern Russia, in migration to China and the Moluccas; recorded from St. Lawrence Island. See Friedmann, Condor, 40, 1938, 88.
- 274 *Vireo griseus noveboracensis* (Gmelin). NORTHERN WHITE-EYED VIREO. [631d.] *Muscicapa noveboracensis* Gmelin, Syst. Nat., 1, pt. 2, 1789, 947. ("Rarior a Majo ad Augustum in Noveboraco" = New York.) Additional subspecies. Arkansas and North Carolina northward. See Oberholser, Dept. Cons. Louisiana, Bull. 28, 1938, 502-503; Burleigh, Occ. Pap. Mus. Zool. Louisiana State Univ., no. 20, 1944, 433.
- 275 *Vireo huttoni insularis* Rhoads. VANCOUVER VIREO. [632e.] *Vireo huttoni insularis* Rhoads, Auk, 10, July, 1893, 239. (Victoria, Vancouver Island, British Columbia.) Additional subspecies. Vancouver Island. See Grinnell, Condor, 42, 1935, 40.
- ✓ 285 *Dendroica aestiva* is conspecific with *Dendroica petechia*, so that all forms of the Yellow Warbler are to be listed as races of *petechia*. See Aldrich, Auk, 59, 1942, 447-449.
- 285 *Dendroica petechia gundlachi* Baird. CUBAN GOLDEN WARBLER. [653a.] *Dendroica gundlachi* Baird, Rev. Amer. Birds, 1, April, 1865, 194, 197. (Cuba.) Additional subspecies. Cuba and Isle of Pines; breeding on one of the Bay Keys near Key West, Florida. See Greene, Auk, 59, 1942, 114.
- ✓ 293 *Seiurus aurocapillus* becomes *Seiurus aurocapillus aurocapillus* because of the division of the species.
- 293 *Seiurus aurocapillus furvior* Batchelder. NEWFOUNDLAND OVEN-BIRD. [674a.] *Seiurus aurocapillus furvior* Batchelder, Proc. New England Zool. Club, 6, February 6, 1918, 81. (Near Deer Pond, Newfoundland.) Additional subspecies. Newfoundland. See Burleigh, Occ. Papers Mus. Zool. Louisiana State Univ., no. 22, 1944, 453.
- 293 *Seiurus aurocapillus cinereus* A. H. Miller. GRAY OVEN-BIRD. [674b.] *Seiurus aurocapillus cinereus* A. H. Miller, Condor, 44, no. 4, July 15, 1944, 185. (4 miles west of Fort Howe Ranger Station, 4000 feet elevation, Powder River County, Montana.) Additional subspecies. Yellowstone River, Montana, to Arkansas River, Colorado, in migration to Sinaloa and Tres Marias Islands, México.
- 296 *Geothlypis trichas typhicola* Burleigh. ATHENS YELLOW-THROAT. [681j.] *Geothlypis trichas typhicola* Burleigh, Proc. Biol. Soc. Washington, 47, February 9, 1934, 21. (Athens, Georgia.) Additional subspecies. South-eastern Virginia to central Alabama, in migration to eastern México.
- ✓ 305 *Agelaius humeralis* (Vigors). TAWNY-SHOULDERED BLACKBIRD. [500.1.] *Leistes humeralis* Vigors, Zool. Journ., 3, December 31, 1827, 442. (Near Havana, Cuba.) Additional species. Cuba and western Haiti; recorded from Key West, Florida. See Demeritt, Auk, 53, 1936, 453.

Page

- ✓ 306 *Icterus gularis tamaulipensis* Ridgway. ALTA MIRA ORIOLE. [503.1.] *Icterus gularis tamaulipensis* Ridgway, Proc. Washington Acad. Sci., 3, April 15, 1901, 152. (Alta Mira, Tamaulipas.) Additional species. Veracruz and Puebla to Tamaulipas; recorded from Brownsville, Texas. See Sclater, Ibis, 1939, 142-143; Burleigh, Auk, 56, 1939, 87-88.
- ✓ 306 *Icterus pustulatus microstictus* Griscom. WESTERN SCARLET-HEADED ORIOLE. [505.1.] *Icterus pustulatus microstictus* Griscom, Bull. Mus. Comp. Zool., 75, no. 10, January, 1934, 408. (Guaymas, Sonora.) Additional species. Jalisco to Chihuahua and Sonora; collected at Murray Dam, near La Mesa, San Diego County, California. See Huey, Auk, 48, 1931, 606.
- 321 *Carpodacus mexicanus potosinus* Griscom. SAN LUIS HOUSE FINCH. [519c.] *Carpodacus mexicanus potosinus* Griscom, Amer. Mus. Nov., no. 293, January 12, 1928, 5. (San Luis Potosí, México.) Additional subspecies. San Luis Potosí through Nuevo León to northeastern Chihuahua and Kinney and Valverde Counties, Texas. See Moore, Condor, 41, 1939, 195.
- 323 *Leucosticte tephrocotis umbrina* Murie. PRIBILOF ROSY FINCH. [524d.] *Leucosticte tephrocotis umbrina* Murie, Condor, 46, May 24, 1944, 122. (St. Paul Island, Pribilof Islands, Alaska.) Additional subspecies. St. Paul, St. George, St. Matthew and Otter Islands, Bering Sea.
- 327 *Spinus tristis jewelli* van Rossem. NORTHWESTERN GOLDFINCH. [529c.] *Spinus tristis jewelli* van Rossem, Condor, 45, no. 4, July 23, 1943, 158. (Ashland, Jackson County, Oregon.) Additional subspecies. Coastal slope from southern British Columbia to southwestern Oregon.
- 328 *Loxia curvirostra curvirostra* Linnaeus. COMMON CROSSBILL. [521g.] *Loxia curvirostra* Linnaeus, Syst. Nat., ed. 10, 1, 1758, 171. (Europe = Sweden.) Additional subspecies. Europe and western Siberia; recorded from Greenland (2 specimens). See Salomonsen, Medd. om Grønland, 93, no. 6, 1935, 6-7.
- 335 *Passerculus sandwichensis rufofuscus* Camras. CHIHUAHUA SAVANNAH SPARROW. [542g.] *Passerculus sandwichensis rufofuscus* Camras, Field Mus. Nat. Hist., Zool. Ser., 24, no. 15, June 29, 1940, 159. (Babicora, Chihuahua.) Additional subspecies. Chihuahua to White Mountains, Arizona, and mountains of northern New Mexico, in migration to western Texas and Jalisco. See Duvall, Condor, 45, 1943, 237-238.
- 336 *Ammodramus savannarum ammolegus* Oberholser. ARIZONA GRASSHOPPER SPARROW. [546c.] *Ammodramus savannarum ammolegus* Oberholser, Proc. Biol. Soc. Washington, 55, May 12, 1942, 15. (Huachuca Mts. at 5000 ft. altitude, 6 miles southeast of Fort Huachuca, Arizona.) Additional subspecies. Southern Arizona, in winter to Guatemala.
- 339 *Ammospiza maritima howelli* becomes a synonym of *Ammospiza maritima fisheri*. See Griscom, Occ. Papers Mus. Zool. Louisiana State Univ., no. 19, 1944, 319-321, 327.
- 343 *Aimophila botterii texana* Phillips. EASTERN BOTTERI'S SPARROW. [576a.] *Aimophila botterii texana* Phillips, Auk, 60, no. 2, April, 1943, 242. (Brownsville, Texas.) Additional subspecies. Southeastern Texas to northeastern Tamaulipas.
- 344 *Amphispiza bilineata confinis* van Rossem. CHIHUAHUA BLACK-THROATED SPARROW. [573d.] *Amphispiza bilineata confinis* van Rossem, Bull. Mus. Comp. Zool., 77, December, 1934, 487. (Chihuahua, Chihuahua.) Addi-

Page

- tional subspecies. Central Chihuahua north to Guadalupe Mountain region of western Texas. (*Amphispiza bilineata opuntia* Burleigh and Lowery, Occ. Papers Mus. Zool. Louisiana State Univ., no. 6, November 10, 1939, 68, described from the Guadalupe Mountains, Texas, is considered a synonym.)
- 345 *Junco hyemalis cismontanus* Dwight. CASSIAR JUNCO. [567k.] *Junco "cismontanus"* Dwight, Bull. Amer. Mus. Nat. Hist., 38, art. 9, June 1, 1918, 295. (Sumas, British Columbia.) Additional subspecies. South-central Yukon through the interior of British Columbia; in migration to southern Rocky Mountain region, California and Baja California, casually eastward. See Miller, Univ. California Publ. Zool., 44, 1941, 175, 329-345, 402-404.
- ✓ 347 *Junco caniceps* becomes *Junco caniceps caniceps*, and *Junco phaeonotus dorsalis* becomes *Junco caniceps dorsalis*. See Miller, Univ. California Publ. Zool., 44, 1941, 175, 180-181, 205-210.
- 353 *Passerella iliaca insularis* Ridgway becomes *Passerella iliaca hyperborea* Bonaparte, from *Passerella hyperborea* Bonaparte, Consp. Gen. Av., 1, pt. 1, 1850, 477. (Kodiak Island.) See van Rossem, Trans. San Diego Soc. Nat. Hist., 7, 1934, 360-361.
- 355 *Passerella iliaca mariposae* becomes a synonym of *Passerella iliaca monoensis*. See Willett, Pac. Coast Avifauna, no. 21, 1933, 182-183.
- 357 *Melospiza melodia fallax*, the MOUNTAIN SONG SPARROW, as listed here, again becomes *Melospiza melodia montana* Henshaw, from *Melospiza fasciata montana* Henshaw, Auk, 1, no. 3, July, 1884, 224. (Fort Bridger, Wyoming.) See Marshall, Condor, 44, 1942, 233.
- 357 *Melospiza melodia fallax* (Baird). VIRGIN RIVER SONG SPARROW. [581s.] *Zonotrichia fallax* Baird, Proc. Acad. Nat. Sci. Phila., 7, no. 3, May-June (July 3), 1854, 119. (Pueblo Creek = Lat. 35° N., Long. 113° W., Arizona.) Additional subspecies. Virgin River Valley, including Zion Canyon, Washington County, Utah, to Pahrangat Valley, Lincoln County, Nevada; in winter along the lower Colorado River from Nevada southward. (Described as *Melospiza melodia virginis* Marshall and Behle, Condor, 44, May 15, 1942, 123, but it is found that the type specimen of *fallax*, named in 1854 from a winter migrant, is of this race, so that *virginis* is a synonym.) See Marshall and Behle, Condor, 44, 1942, 122-124; Marshall, Condor, 44, 1942, 233.

GENERAL NOTES

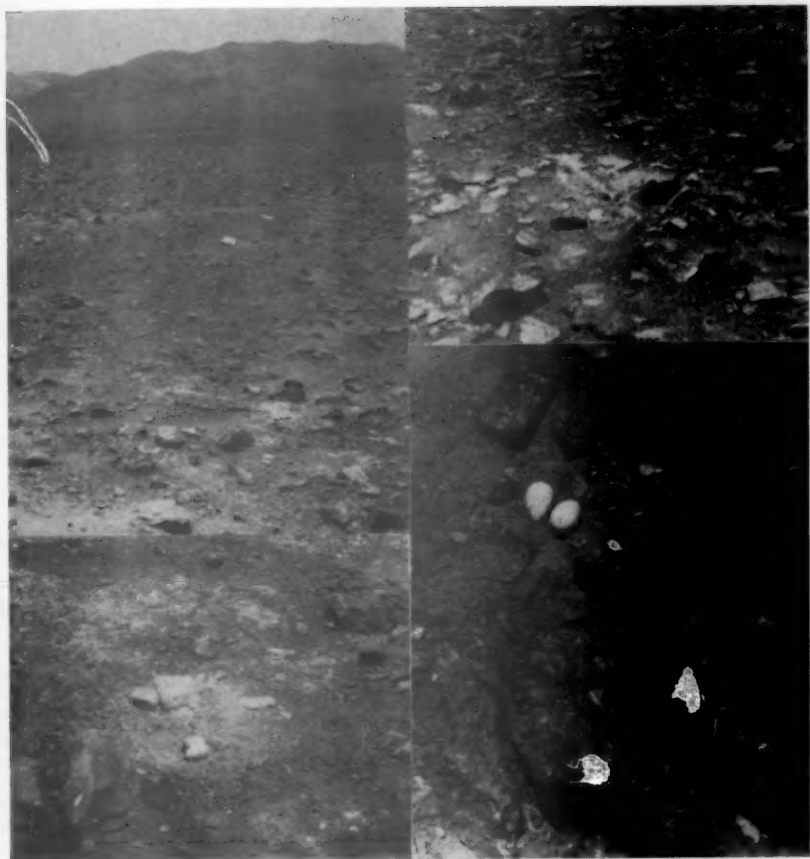
Nesting habits of the Peruvian Gray Gull.—(Plate 21)—An interesting 'quiz' question for the ornithologist would undoubtedly be: "What bird is found on the sea coast every day of the year and yet never nests there?" The correct answer is *Larus modestus* or the Peruvian Gray Gull, a bird whose peculiar nesting habits have long been the subject of much speculation among ornithologists.

Our acquaintance with this interesting bird, which is found all along the West Coast of South America from Piura in northern Peru to Valdivia in southern Chile and is without doubt the commonest species of gull inhabiting the arid littoral from the northern limit of its range down to the latitude of Coquimbo, dates back to the time of our arrival in northern Chile some 30 years ago. While stationed on the sea coast at a point about 20 miles north of the nitrate port of Iquique, we had occasion to observe the Gray Gull at close quarters, and noticed that, though it was present in large numbers all the year round, there was never any trace or indication of nests or eggs.

Further investigation showed that during the summer months (November to January) this gull, known locally by the name of 'Garuma,' might be observed rising from the sandy beaches at sunset in large flocks, which, after describing wide concentric circles until considerable altitude had been gained, would suddenly disappear landwards in loose formation to the accompaniment of many raucous and oftentimes plaintive cries. After early efforts to locate possible nesting sites among the barren wastes of the arid coast range had proved entirely fruitless, transfer to a nitrate plant in the desert interior brought the surprising information that on certain nights during the summer months, especially those with heavy fog, the unmistakable, plaintive note of the Garuma Gull might be heard penetrating the darkness.

Repeated enquiries among the local workers brought the further information that these gulls might be found nesting in certain isolated, uninhabited regions of the 'pampa' or nitrate desert, but such reports, on being investigated, invariably ended in disappointment. By the time we reached the supposed nesting grounds, something had always happened—either we were too early or else too late or, in the latter case, we were informed that the birds must have moved to a new site. Finally, in November, 1919, we did succeed in tracking down a small colony which was just beginning to nest on the stony slopes of an isolated, desolate stretch of country, situated among the hills of the coast range between the Lagunas Nitrate Plant and the guano-covered promontory known as 'Punta de Lobos,' some 80 miles south of the nitrate port of Iquique. On this occasion we obtained three clutches of two eggs each, but unfortunately no photographs.

It was not, however, until many years later, with out interest now thoroughly aroused by the knowledge that the nesting habits of this gull were unknown to science, that we decided to make a new effort to locate a colony and obtain the necessary photographs and documentary evidence. In this, after further failures and many disappointments, we were finally successful. On November 22, 1943, after traveling some 800 miles especially for the purpose, we managed to locate a colony situated among gently undulating hills at a point in the coast range some 35 kilometers inland from the nitrate port of Tocopilla, in the Province of Antofagasta, Chile (Lat. 22° 26' S., Long. 69° 59' W.). At this point the desert is strewn with an enormous number of small, irregular stones after the style of the 'hamadas' of Algeria and Tunis and, rising gently towards the north, is enclosed by a semicircle of hills, which reach a height of 2335 meters and are known as the 'Cerros de Colupo' (see Plate 21).



GOODALL, PHILIPPI, AND JOHNSON: NESTING OF THE PERUVIAN GRAY GULL.

V

i

m

s

d

a

a

I

P

su

a

T

in

th

re

w

li

(l

va

w

a

pl

th

su

th

th

es

m

pe

ex

va

hi

ch

of

pr

se

an

wh

qu

sta

A.

of

pe

Against this background and over an area of some five square kilometers, a colony of *Larus modestus* was in the initial stages of nidification. Here and there, at irregular intervals, sometimes singly and sometimes in small groups but always in the immediate proximity of one or more small stones, a large number of rounded, cup-shaped excavations were to be observed in the loose surface of the yellowish-brown desert earth. Most of these cup-shaped hollows were still empty, but every now and again we came across one containing eggs; altogether five nests with two eggs and four with only one egg were found, all of them perfectly fresh (see Plate 21). In addition there were a number of mummified fledglings, evidently casualties from previous years' nesting operations.

As we walked about the nesting area a few Garumas flew past us in slow and desultory fashion, alighting from time to time on the ground only to fly up again as we approached. Altogether we must have seen about 50 Garumas and one solitary Turkey Vulture (*Cathartes aura jota*)—between them the only living things in all that immense solitude, otherwise so utterly devoid of life that not a single plant can live there nor an insect disturb the vast silence of its desolate wastes.

The eggs of the Garuma are very different from the usual gull type, and doubtless represent an adaptation to the very special conditions of strong light, heat and glare which characterize the environment in which they are laid. The ground-color is very light, varying from white with faint pearl-gray suffusions, to pale ochraceous salmon (Ridgway); over this are to be found a few clearly defined though smallish spots in varying tones of chestnut brown and others, so faint as to be scarcely discernible without a magnifying glass, of light violet gray. The measurements of 14 eggs give a length of 58.3 ± 0.57 mm. and a width of 41.3 ± 0.28 mm.

The fact that the scrape in the ground which does duty as a nest is almost always placed alongside a stone is curious and would seem to indicate that the birds recognize the need to provide the nestling with some degree of shade and protection from the sun and wind during their daily absences from the colony in search of food. Similarly the need to cover the eggs or young during the chilly nights no doubt accounts for the flocking from the sea coast at sunset.

That these colonies sometimes assume very large proportions is proven by the fact, established personally by a friend of ours, that the year previous to our visit, five men with baskets and a truck brought away from this same colony and sold in the port of Tocopilla no less than 30,000 eggs. Such vandalism would, of course, soon exterminate the species, but fortunately opportunities are few and far between as the vast stretches of seemingly limitless, all-but-uninhabited desert which form the hinterland of this gull's range both in Chile and Peru, provide the widest possible choice of nesting sites and every facility for changing to another location in the event of molestation. That these sites are sometimes as much as 100 kilometers inland is proven by the discovery of a nesting colony or 'Garumal' in the Aguas Blancas section of the nitrate pampas of Antofagasta.

Why this bird, essentially an inhabitant of the sea-coast, should have chosen such an extraordinarily un-gull-like environment for its nesting activities and how and when this ultraspecialized habitat became standard practice for the species are questions for which we offer no explanation. We can only leave on record what this standard practice is and leave it at that.—J. D. GOODALL, R. A. PHILIPPI B., AND A. W. JOHNSON, *Santiago, Chile*.

Longevity record of Black-cheeked Weaver.—Longevity records are always of interest to the ornithologist. If an individual has been in captivity for a known period, or has been tagged in some manner so that its identity can be recognized, the

authenticity of the record is established. In 1926, the Smithsonian-Chrysler Expedition to Africa collected a number of Black-cheeked Weavers (*Ploceus intermedius*). This form inhabits East Africa from Abyssinia to Tanganyika. Of the group collected, three are still living in the National Zoological Park, Washington, D. C. These birds have been in captivity for some nineteen years, which is, I believe, a record.—MALCOLM DAVIS, *The National Zoological Park, Washington, D. C.*

An unusual note of the White-crowned Sparrow.—A persistent note, uttered with the regularity of a cricket's chirp, came from our back yard on numerous evenings in the fall of 1943. My curiosity was aroused, but for some days I could not identify the bird which was usually in the heart of our arrowwood (*Viburnum dentatum*) where it must have spent the night. It was so dark by the time the call commenced that only the form of a bird, if anything, could be discerned. Before I finally identified the maker of the strange call, I heard it in two other places—one a mile from our house, and the other a mile and a half in another direction. Finally, on October 9, I was able to get a good view of the bird through my binoculars as it called from a neighbor's yard. It was a White-crowned Sparrow (*Zonotrichia leucophrys leucophrys*).

The call was always given as the bird sat almost motionless, usually concealed in the center of some shrub or vine. It seemed almost an alarm note in quality, resembling the *peep* (not the Goldfinch-like) call of a canary. Being loud and uttered in rapid succession, it was so properly timed that it was distinctive. The call was nearly always heard quite late in the evening, apparently just before the bird retired. On several occasions several birds called at once.

I listened during the fall of 1944 for this performance but did not hear it once. Ordinarily I do not list the White-crown in the fall migration, and this call is my only clue to its probably greater abundance in the 1943 migration. I suggest that others listen for this note if it is not a regular call of the White-crowned Sparrow.—ROBERT E. BALL, 2622 Tuscarawas St. W., Canton 6, Ohio.

John Bartram on the Passenger Pigeon in Florida.—Bartram was at Lake George, Florida, on January 24 and 25, 1766. On the 24th he explored the stream connecting Lake George with Lake Kerr in Marion County, and camped for the night on Bryan's (Drayton's) Island at the north end of Lake George. The entry in his journal for the 25th reads in part: ". . . saw several flocks of pigeons flying about yesterday and to-day" (William Stork. A description of East-Florida with a journal kept by John Bartram of Philadelphia, 25: 1769, London). This is in approximate latitude 29° 20' N. and appears to be the southernmost record for the Passenger Pigeon (*Ectopistes migratorius*) in Florida.

It is stated by A. H. Howell (*Florida Bird Life*, 280: 1932) that the species occurred formerly at least south to Alachua County. He cites Stork's statement but overlooks Bartram's entry.—A. W. SCHORGER, 168 N. Prospect Avenue, Madison, Wisconsin.

The food of the Red-shouldered Hawk in New York State.—From 1939 to 1942, a study of the food taken by the Red-shouldered hawk (*Buteo lineatus lineatus*) in central New York was conducted by the writer, in addition to a bird-of-prey banding program in effect at the time. During those four years, periodic observations were made each spring on the food captured by four nesting pairs within twenty miles of the city of Syracuse, New York.

Principal methods of study were to observe from strategically located blinds the food brought to the immature birds by the adults, as well as the food that was often

brought to the females by the males during the period of incubation. Laboratory examination was made of all bits of hair, feathers, and partial castings found in the vicinity of the nest, and several stomachs were taken from birds accidentally or purposely killed by farmers and sportsmen. (The Red-shouldered Hawk is specifically protected by law in New York State.)

Based on these observations, I have revised somewhat a table showing the approximate percentages of various foods included in the diet of this species, applicable to this section of the state and perhaps to a larger area where conditions of habitat and food supply are similar.

TABLE BASED ON OBSERVATIONS ON 16 RED-SHOULDERED HAWK NESTS, 1939-1942,
SYRACUSE, NEW YORK

MICE AND RATS (principally <i>Microtus</i>)	58%
FROGS, AMPHIBIANS (principally <i>Rana pipiens</i> and salamanders)	18%
INSECTS (largely made up of grasshoppers taken in July and August; beetles and spiders also taken, caterpillars of several species)	10%
REPTILES (largely common garter snakes, water snakes)	3%
SMALL BIRDS (often taken during spring migration; includes Song Sparrow, Horned Lark, Chickadee, Downy Woodpecker)	8%
MISCELLANEOUS (includes crawfish, carrion, minnows, etc.)	3%

By far the most popular food throughout this region of medium to heavy agriculture is the field mouse, which is common and easily captured. It is the food most commonly fed the three or four young during the brooding period, and of decided economic value to the local farmers.

The Red-shouldered Hawk generally begins nesting activities in this region anywhere from the first to the twentieth of April, and during this period occasionally preys on the small migrating birds or on the winter residents. In four years, only one authentic case of a hawk taking poultry was observed; on June 1, 1940, an adult female brought a freshly killed domestic duckling to the nest.

There can be no doubt that this species is a decided asset to the farmers of this region, and should be encouraged in every woodlot where it has set up residence.—STANTON G. ERNST (formerly, Dept. of Forest Zoology, New York State College of Forestry, Syracuse, New York).

Food of Ruffed Grouse in southern Michigan.—The crops of thirteen Ruffed Grouse (*Bonasa umbellus umbellus*) were preserved in formaldehyde by Michigan hunters and were later sent to me for food analysis. The birds were collected on the southern peninsula in the month of October. Of the thirteen crops, eleven were full of food and two were practically empty. All the food contained was vegetable. The two main staples in the diet of these birds were the acorn of the pin oak (*Quercus palustris*) and some leaves of a tree that was not identified positively, but appeared to be either a birch or an aspen. Nine of the crops contained either or both of these foods and nothing else. The cups of the acorns were discarded by the birds. Some of the acorns were of large size (2 x 1.5 cm.), and several of these nuts caused bulging crops.

Other food found in the crops was: Leaves of alsike clover (*Trifolium hybridum*)—in two birds. Cornaceous fruit of hawthorn (*Crataegus*)—found in one crop. Dandelion leaves (*Taraxacum officinale*)—one crop. Flat seeds with shiny black fruit skins, one of the *Viburnums* probably the black haw (*Viburnum prunifolium*)—found in one crop.

There were no parasites found in the crops. The eggs of the botfly were found on the outside of the stomach wall, but must have been laid there before the crops were preserved.

I wish to express my appreciation to Dr. Albert Bechtel, Professor of Botany, for identifying this plant material with the aid of the Wabash College herbarium.—HOWARD H. VOGEL, JR., *Wabash College, Crawfordsville, Ind.*

American Rough-legged Hawk found dead at Crawfordsville, Indiana.—An immature male Rough-legged Hawk (*Buteo lagopus s. johannis*) was found dead on the campus of Wabash College in Crawfordsville, Indiana, in late November, 1944. The bird had no broken bones, and showed no evidence of being shot, but showed a hemorrhage of the brain, indicating that death was probably due to concussion. There was no food in its digestive tract.—HOWARD H. VOGEL, JR., *Wabash College, Crawfordsville, Ind.*

Food habits of Sanderlings.—On the beach at Lawrence Harbor, Middlesex County, New Jersey, August 26, 1944, Henry W. Fowler and the writers were watching Sanderlings (*Crocethia alba*) feeding among dead and decaying bivalves, which they found at the high-tide mark. Suddenly a few found some dead silversides (*Menidia menidia*), which the authors had left on the beach. First they pecked at them, but their slender bills made little headway against the tough scales of the fish. Others attempted to secure the fish for themselves, and consequently a violent battle was in progress most of the time. One Sanderling would viciously chase another while in the meantime, a third would run off, carrying the fish in its mouth. When the battle became too great, the momentary possessor swallowed the fish whole. It is doubtful if the Sanderlings were capable of catching living silversides, but the dead ones seemed much in demand.—JANET L. C. AND WILLIAM F. RAPP, JR., *University of Illinois, Urbana, Illinois.*

Blue egg in a Pheasant's nest.—In the belief that the occurrence of a bright blue egg in the nest of the Ring-necked Pheasant (*Phasianus colchicus torquatus* Gmelin) is sufficiently rare, the following note would appear to be worth placing on permanent record. On June 7, 1941, I forwarded to the Royal Ontario Museum of Zoology, in Toronto, three pheasant eggs, two of which appeared to be normal in color and size, while the other was bright blue and somewhat unusually large. In acknowledging the receipt of the eggs, Mr. L. L. Snyder, Assistant Director, informed me that although there is considerable variation in color, size, and shape of the pheasant eggs in the museum collection they had nothing like the blue one. The specimens in question were obtained from an abandoned nest, said to contain twenty-six eggs when first seen, but which was later found to be much disturbed by some animal, with most of the eggs broken and the hen bird missing. The nest was situated in a dense bed of tansy weed within a few feet of the public road just north of the village of Queenston in Lincoln County, Ontario, and the salvaged eggs were brought to me by Mr. G. H. R. Laidman of that village who had seen the nest before it was destroyed and deserted and had been interested in its welfare. The presence of over a score of eggs in the nest when first seen would probably indicate the product of more than one female, a supposition expounded by Ogilvie-Grant (*Lloyd's Natural History—Game-Birds*, 11: 14, 1897, London). The same author, in the same place, describes the eggs as "generally brown or olive-brown in colour, more rarely bluish-green." The foregoing is the only reference in literature that I have been able to find in which the colour blue, or bluish, is even mentioned in reference to pheasant eggs.—R. W. SHEPPARD, 1805 Mouland Avenue, Niagara Falls, Ontario.

Heat insulation in the tarsi and toes of birds.—It has puzzled many people why the feet of birds do not freeze in sub-zero temperatures, particularly in those species with bare tarsi. The answer is obviously insulation against loss of heat, but it is not often that one has an opportunity of getting much factual data on this point.

An opportunity came to the writer when camped in a tent in the Duck Mountains, Manitoba, during the second week of October, 1944. These mountains are in the Canadian Zone. During a stay of four days at East Blue Lake, the writer succeeded in taming four Canada Jays so that they would come racing to his hand when called from the forest and would come right into the tent at the far end and take scraps from the hand and even from the mouth. The approach to the interior of the tent was always the same—first on the grocery box near the entrance, thence either to the box stove or to an open pot thereon, and then to the hand.

As the weather was frosty, the stove was under full draft and the thin metal was, at times, almost red hot. When gripping an open half-gallon iron pot, the birds would stay there for 30 or 40 seconds. After some 15 seconds, they would stretch and close the toes alternately, apparently to permit radiation of the heat taken in. Several times, however, the birds stayed on the hot stove (when the pot was absent and while the flames were licking the roof of the stove) for from five to eight seconds, showing discomfort by crouching but still tolerating it. The heat was sufficient to make a drop of water flash into steam.

This observation has made me realize the marvellous insulation against the transfer of heat possessed by these birds. I am not aware of any research having been done to test and measure the conductivity of the tissues of the feet of birds but it would seem that this could very easily be done and might be a worthwhile contribution to our knowledge.—L. T. S. NORRIS-ELYE, *Winnipeg, Canada.*

English Sparrow eating salt.—From June 25 to 27, 1944, some interesting observations were made on the feeding habits of the English Sparrows (*Passer domesticus*) nesting on the farm of Miss Edith L. Hause, Route 5, Huntington, Indiana. There were two salt blocks in the barnyard for the use of the small herd of cows. From dawn until dusk there was a continual stream of sparrows visiting these blocks, pecking off small bits of salt. These sparrows must have obtained a much greater amount of salt than is needed to maintain their normal metabolic requirements. Certainly these sparrows were obtaining more salt than most other birds are able to obtain. Although I am unable to offer an explanation for the physiological need of such large quantities as were apparently consumed by these birds, I believe that these observations should be recorded.—JOHN B. CALHOUN, *Dept. of Biology, Emory University, Georgia.*

The sequence of molt in Purple Grackles.—Purple Grackles (*Quiscalus quiscula stonei*) trapped at Harrisburg, Penna., for banding studies gave an opportunity for observing the sequence of their postnuptial molting. Between March 19 and September 18, 1944, I trapped and banded 146 Purple Grackles. Evidence of molting, with new feathers, first appeared on July 23. The molting period extended until mid-September, and with other observed grackles until mid-October. The first feathers molted were those along the edge of the wing, the last were the central tail feathers. Individual check notes were tabulated on 52 birds, all adults with white irides. The sequence of molting was determined to be in the following order of feather groups: lesser wing-coverts, greater coverts, secondaries, forehead, crown, nape, rump, primary-coverts, upper tail-coverts, cheeks, neck, back, belly, under tail coverts, scapulars, proximal primaries, breast, chin, and finally the distal remige and then the median rectrices.

The old axillars were retained by some birds until all but the primaries and rectrices were completed. In some birds the auriculars were shed after the rest of the head had received its new quota of feathers. The molting on the breast was irregular in only one bird. Practically all the birds exhibited great regularity in their molting areas. The proximal remiges were shed and regained quickly, but the distal four were lost in regular order and slowly redeveloped. Those feathers with stiff quills were the slowest to grow. In nearly all the birds, the secondaries were either all old or all new; in only four was it seen that the central secondaries, the 4th and 5th, were old while all the others were fully developed, except one third and one sixth. The median body feathers were shed and grown before the laterals, both dorsal and ventral, as along the spine before the side areas. These developments agree with the dispositions of the primary pterylar tracts in a nestling, but no opportunity was offered to study the sequence of development of the primary feather tracts in grackles.—HAROLD B. WOOD, *Harrisburg, Pennsylvania*.

Notes on the Duck Hawk in Ashland County, Ohio.—An immature female Duck Hawk (*Falco peregrinus anatum*) was shot on the Dr. Hess and Clark Research Farm located two and one-half miles east of Ashland, on September 29, 1944. This specimen constitutes the first known county record. The skin was preserved and deposited in the Biological Collection of Ashland College.

The specimen was examined by Dr. Paul D. Harwood of Dr. Hess and Clark Incorporated and yielded the following parasites:

An immature strigeid trematode which could not be identified further was found in the intestines.

Six specimens of *Cladotaenia foxi* McIntosh, 1940 were found in the intestines. Duck Hawks probably acquire this infection by eating mice since the intermediate host of *C. foxi* was found experimentally to be a mouse (McIntosh, Proc. Helminth. Soc. Wash., 7: 71-74, 1940). This parasite is not known to occur in any definitive host other than the Duck Hawk. The present record constitutes the third time it has been taken from this falcon (Guthrie, J. E. and P. D. Harwood, Amer. Jour. Vet. Res., 2: 108-116, 1941).

Eight nematodes that are tentatively identified as *Synhimantus laticeps* (Rudolphi, 1819) were found in the proventriculus. This is believed to be the first record of this form in the western hemisphere, although it has been reported many times from hawks and owls of Europe, Asia and Africa. The available material differs slightly from descriptions of Old World material in certain body proportions, but until additional material is available, it is believed preferable to refer these specimens to *S. laticeps*. A conspicuous area of inflammation was noticeable at the region of attachment of these nematodes.—NORMAN A. PREBLE, *Department of Biology, Ashland College, Ashland, Ohio*.

On the type of *Cassicus melanurus* Cassin.—Many years ago, Cassin described a new species of cacique which supposedly came from Guayaquil in Ecuador, a most unlikely place for a forest-haunting bird. The locality, according to Cassin, was written on the original label in the hand of Victor Massena, Prince d'Essling. The bird formed part of the Rivoli Collection (Massena was also the Duc de Rivoli) which was presented to the Academy of Natural Sciences of Philadelphia by Thomas B. Wilson in 1860.

Cassin described the bird in the Proceedings of the Academy in 1867, (p. 66) noting that the tail was entirely black, as were the under tail-coverts, and that the specimen differed from other known species of caciques by having "a wide band immediately above the under tail coverts, yellow."

In 1899 (Proceedings A. N. S. P.) Stone reviewed the types of birds in the Academy's collection and, when dealing with *C. melanurus*, completely ignored its wholly black tail and relegated it, without comment, to the synonymy of *Cassicus cela flavicrissus* Sclater. That it should be a synonym of that bird is impossible for all forms of *C. cela* have a bicolored tail, yellow on the basal part, black on the distal. Hellmayr, following Stone, also placed *melanurus* in the synonymy of *flavicrissus*, but in a footnote, remarked on the wholly black tail as a reason for doubting Stone's allocation (Field Mus. Nat. Hist., Zool. Ser., 13, pt. 10: 27, 1937).

Recently I became interested in this type and, when I found it could not be matched by any known species, had it relaxed. It was quickly apparent that the "wide band immediately above the under tail coverts, yellow" had been ingeniously glued in. Without the yellow on the under parts, the specimen is a perfectly good example of *Archiplanus l. leucoramphus* (Bonaparte), known from Colombia and eastern Ecuador. It should of course, be placed in the synonymy of that bird, which was described in 1845.

Zimmer's *A. l. peruvianus* is said to have the concealed white collar confined to the neck but in Cassin's type this collar is very much more extensive, showing "*melanurus*" definitely to be a synonym of the nominate form. Fortunately all this results in no nomenclatorial changes.—RODOLPHE MEYER DE SCHAUSENSEE, Academy of Natural Sciences, Philadelphia, Pa.

Forster's Tern in North Carolina.—Regarding the Forster's Tern (*Sterna forsteri*), the revised (1942) edition of 'Birds of North Carolina' (Pearson, Brimley, and Brimley) records only five instances of its occurrence in the state, all in the autumn. "The Forster's Tern," it states, ". . . is today apparently one of the rarest of our terns" and is "known to occur only as a rare autumn migrant." With this in mind, the following observation should be of interest.

The mainland of eastern North Carolina ends in a narrow coastal strip of marshes and sounds, through which runs the Inland Waterway on its course between New York and Jacksonville. Seaward from the Waterway, protecting it from the fury of the Atlantic Ocean, lie the offshore island beaches, a principal feature of the middle eastern seaboard. Wrightsville Beach, fifty miles northeast of the South Carolina border, and seven miles east of Wilmington, North Carolina, is a typical habitat of this sort.

On February 2, 1941, while crossing the bridge and causeway over Wrightsville Sound, I noticed two medium-sized terns with deeply forked tails, feeding in the marsh area. Their bills were mostly black and their eyes were surrounded by black areas on the sides of their heads. I noted them as Forster's Terns pending further confirmation. The next day, February 3, I visited Carolina Beach, ten miles farther south. Along a stretch of outer beach five miles long, I saw about twenty birds with the same characteristics. My next trip to the seacoast in the Wilmington area was on February 7, 1941, when I visited it in the vicinity of Fort Fisher near the mouth of the Cape Fear River. There I saw five or six birds, of which one, an immature female Forster's Tern, was collected. When I returned to Wrightsville Beach on February 10, there were five birds present. The specimen was added to the Fuertes Memorial collection at Cornell University where its identification was confirmed by Dr. Arthur A. Allen.—GERALD ROGERS, CAPT., A. C., Oklahoma City, Oklahoma.

Canada Jay in Connecticut.—On December 30, 1944, while hunting in the highlands of North Colebrook, Connecticut, less than a mile south of the Massachu-

setts border, Ralph C. Morrill saw a Canada Jay (*Perisoreus canadensis*) fly from a stand of spruce two hundred yards away to a small maple about seventy-five feet from him. The bird flew back and forth a few times across a small ravine where slash remained from the previous year's logging of white pine, then back to the spruces. Mr. Morrill later learned that a deer had been shot there. Perhaps this jay, as frequently happens in the north woods, had been attracted to the viscera.

As far as I have ascertained, this constitutes the most southerly New England record of this species, and the first from Connecticut. At least twenty Canada Jays have previously been reported casually from Massachusetts (E. H. Forbush, *Birds of Massachusetts and other New England States*, 2: 385, 1927; A. C. Bagg and Samuel A. Eliot, *Birds of the Connecticut Valley in Massachusetts*, 1937; *New England Bird Bulletin* through 1944). Of these the most southerly were at Westfield, where Robert K. Smith saw two in February, 1926, and one on January 28, 1931 (Bagg and Eliot, p. 398). Mr. Morrill's observation, therefore, pushes the New England boundary of this bird's range about six miles farther southward. He has long been acquainted with the Canada Jay in Maine.—STANLEY C. BALL, *Peabody Museum, Yale University, New Haven, Connecticut*.

Black-crowned Night Heron in Washington, D. C.—In 1911, there came to the tall trees that border the large outside flight cage in the National Zoological Park, Washington, D. C., many pairs of the Black-crowned Night Heron (*Nycticorax nycticorax naevius*). Possibly the captured species in the cage attracted them, but no doubt the large buckets full of fish that are fed daily to these captive birds were an added inducement to stay near-by and form a colony of breeding pairs. At this date, August, 1944, the colony has increased to some fifty nests and has maintained itself for about thirty-three years of unbroken activity. Dr. Alexander Wetmore, Secretary of the Smithsonian Institution, told me that he had observed the colony first in 1911.

In the evening, the adult nesting pairs leave their colony and fly in a straight line toward the Potomac River, and at times, when the demands of their young are heavy, the parent birds fish by night and day. We have observed the courtship, nidification, and care of the young, and have pointed out to zoo visitors the plumage patterns of the immature and adult, the nuptial dress of the species, the act of the parents feeding the young by regurgitation, the pale dull blue eggs on the frail platform nest of sticks, and the fledglings sitting on the rim of their nests looking upon the exotic birds in the near-by cage.

I have seen the birds passing across the skies above the city and 'quawking,' as the gloom of the evening enveloped the nation's capital, but most Washingtonians do not look up and see them; for after all, the colony has been resident in the city for some thirty years, and is accepted as commonplace.—MALCOLM DAVIS, *National Zoological Park, Washington, D. C.*

Bald Eagles and Woodcocks in central-western Illinois.—The accumulation of Bald Eagles, which gather yearly south of the Mississippi River Dam between Keokuk and Hamilton, has become almost constant because of the protection afforded these birds. Twenty-five to thirty birds normally gather south of the great dam and hunt along the river for ten to forty miles. More than twenty individuals have been seen recently, and Saturday, February 3, the writer counted nine mature Eagles sitting on the rocks that break the water below the dam. No doubt this accumulation will continue as it has for years, as long as the usual abundant supply of fish is available.

I have not discovered a nest of Woodcock eggs since the tragic winter of 1940. Imagine my surprise, during this fall hunting season (1944), to have five different Woodcocks brought to me for identification, killed by hunters ignorant of the law protecting them. Another Woodcock was captured in a garage and brought to me alive. I banded and released it.

Late in November, 1944, I had a letter from J. W. Summers, science teacher at the Griggsville High School, which read: "For the past two weeks I have been observing what to me is most unusual. About three miles northeast of Perry, in a creek valley, some two or three hundred Woodcock have been having a great time feeding. I first observed them on November 13, again November 20, and November 23 and 26. On the last date few remained. In the past twenty-five years, I have seen possibly fifteen Woodcocks all told, but never before anything like the number accumulated in the Perry creek valley."

It has probably been fifty years since a similar accumulation was reported from the middle Mississippi Valley. Whether this invasion of Woodcocks is due to an unusually good year on the feeding grounds or to a shift of migration route due to unsatisfactory breeding conditions in the east, is difficult to tell. Certainly, in the spring and fall of 1945, we shall watch the same valley for a similar invasion.—T. E. MUSSELMAN, Quincy, Illinois.

A further record for the Double-crested Cormorant from the Pleistocene of Florida.—Early in 1934 the late Walter Wetmore Holmes forwarded to me a number of bones of the Double-crested Cormorant (*Phalacrocorax auritus*) from the pit on Florida Avenue, Bradenton, Manatee County, Florida,¹ that furnish a new locality for this species from the Pleistocene of the state. For various reasons the specimens were laid aside at the time but it seems desirable now to place them on record. The lot includes parts of right and left humeri, an ulna, a fragmentary radius, a coracoid, one vertebra and a broken lower jaw, all found associated in such a manner that the collector, Mr. J. E. Moore, believed that they are parts of the skeleton of one individual bird.—ALEXANDER WETMORE, *Smithsonian Institution, Washington, D. C.*

Yellow Rail nesting in Massachusetts.—On August 1, 1944, my son Richard and I were taking a bird walk through the salt marshes in Essex County, Massachusetts. Following the railroad tracks toward Newburyport, we were crossing one of these marshes and had reached a point about half way when we heard a bird call which seemed to come from the marsh grass at the base of the roadbed. The tracks here were elevated about 12 feet above the marsh. Directly beneath us was a bare spot in the marsh, roughly triangular in shape and approximately six feet across. It was from the grass fringing this spot that the call seemed to come.

We waited quietly and were soon rewarded by seeing a Yellow Rail (*Coturnicops n. noveboracensis*) walk leisurely out of the marsh grass to the center of the bare patch where it stopped to stretch and preen its feathers. It was not more than 18 feet away from us, and being above it we had an excellent chance to study it. Then, to add to our enjoyment and surprise, another Yellow Rail, the female, with her brood of black downy young, approached through the marsh grass to the edge of the same bare spot. Just how many young there were it was impossible to tell, as they did not stray far from the marsh grass, and were constantly on the move, running back and forth. We did, on several occasions see four at one time and judged that there were six or seven in the brood. The female did not venture far out into the open, as

¹ See Wetmore, A., *Smiths. Misc. Coll.*, 85 (no. 2): 8, April 13, 1931.

did the male, but would occasionally dart out and pick up some morsel with which to feed the young.

We were fortunate in being able to watch this family scene for a matter of minutes, until, in fact, the mosquitoes made remaining longer a problem. Immediately upon our moving we were discovered, and the birds scattered in all directions so that we were unable to obtain any further views of them. The size of the downy young would positively indicate that the nest had been in this marsh. This marsh is usually flooded at full moon and it is probable that the first set of eggs was washed out, which would account for the lateness of this brood.—WILLIAM G. F. HARRIS, *Dorchester, Massachusetts*.

A Dovekie in Connecticut.—During a severe wind and rain storm on January 1, 1945, a Dovekie was shot on a creek at Lord's Cove, on the east side of the Connecticut River, in the town of Lyme, and was brought to me. Presumably it had been driven inland by the severe wind. It furnishes the only record since the big flight of November 19, 1932, which extended from Massachusetts to southern Florida, when thousands of these little auks perished.—ARTHUR W. BROCKWAY, *Hadlyme, Connecticut*.

Connecticut Warbler in Vermont.—Bennington, Vermont, was very fortunate in having an unusually large and interesting fall migration of warblers in 1944. The last two weeks of September saw thousands of warblers passing to the south. On the afternoon of September 23, we found a dead warbler which we were unable to identify. The bird was sent to the American Museum of Natural History in New York, where it was identified as an immature Connecticut Warbler. So far as I can learn, the only records of this warbler being found in Vermont are one or two uncertain sight identifications.—DR. AND MRS. LUCRETIVS H. ROSS, *Bennington, Vermont*.

Cypseloides major in Bolivia.¹—In their account of the 'Birds of Bolivia' (pt. 2, Proc. Acad. Nat. Sci. Phila., 95: 199, 1943) Bond and de Schauensee write that *Cypseloides major* Rothschild, "... has been recorded as of doubtful occurrence in southern Bolivia," and therefore do not list it as a definitely ascertained member of the Bolivian ornith. It may be of interest to record that a specimen of this swift was collected at Tarija (1900 meters), Bolivia, in May, 1925, by Emilio Budin, and is now in the United States National Museum (no. 264931). The bird is an adult male with a wing length of 154 mm. and a tarsal length of 14.5.—HERBERT FRIEDMANN.

American Merganser in Puerto Rico.—On November 20, 1944 a female American Merganser (*Mergus merganser americanus* Cassin) was killed on the Añasco River, Puerto Rico, about eight miles from where it empties into the sea, by Mr. Miguel Philippi, a local sportsman who is greatly interested in the migration of birds. He brought the duck to me to learn its identity and presented it for my collection. According to him the bird was swimming alone on a pool, feeding among the aquatic vegetation where small fishes are abundant.

So far as I am aware this is the first authentic record of the occurrence of the American Merganser in the West Indies. James Bond in his 'Birds of the West Indies' includes the Hooded Merganser (*Lophodytes cucullatus*) as a rare winter visitor to Cuba, and the Red-breasted Merganser (*Mergus serrator*) from only one record from the same island.

Although the females of the Red-breasted and American Mergansers are very similar in coloration and easily confused, I am positive of my identification.—VEN-

¹ Published by permission of the Secretary of the Smithsonian Institution.

TURA BARNÉS, JR., *Division of Fisheries and Wildlife Conservation, Department of Agriculture and Commerce, Mayaguez, Puerto Rico.*

Hooded Merganser in St. Croix, Virgin Islands, U. S. A.—This is an exciting record for *Lophodytes cucullatus* and one that could have been verified only by the taking of a specimen which I collected from among three birds seen on December 18, 1944. The birds were rather unsuspicious of my presence in the little pond at Rustop-twist, and quietly swam ahead of me into the mangroves at one point only to emerge soon afterwards at a distance no greater than twenty-five yards on my right. The specimen is a female in winter plumage. It appeared that all three birds were identical in plumage and, therefore, probably were of the same sex. No other species of waterfowl were seen on the pond.—HARRY A. BEATTY, *Christiansted, St. Croix, Virgin Islands.*

Sight record of the Western Grebe on Long Island.—While taking a Christmas census for Bird-Lore on December 24, 1934, with Messrs. Grier and Robert Ralston, I noticed a large grebe near the bluffs at Old Field Point, Port Jefferson Harbor, Long Island, New York. Careful study with binoculars revealed that it was a Western Grebe (*Aechmophorus occidentalis*). The characteristic markings and posture, as well as the distinctive shape of the bill, were clearly evident. Unfortunately, the bird had flown by the time my companions joined me. Because of the rarity of this species on the Atlantic coast, this observation was omitted from the census published in Bird-Lore. Recently, however, a number of records of the occurrence of this grebe in the east have been published, and it seems proper now to add this observation to them. Cruickshank (Birds of New York: 53, 1942) records a previous observation of the Western Grebe on Long Island, at Long Beach, on May 21, 1916.—FRED MALLERY PACKARD, Lt. (j. g.), USNR.

***Branta c. hutchinsi* on the Atlantic coast.**—Taverner, in his account of the Canada Geese (National Museum of Canada, Ann. Rep. for 1929: 30-40, 1 pl., 4 figs., 4 tables, 1931), made sufficient allowance for stragglers of *Branta canadensis hutchinsi* occurring on the Atlantic Coast, although the main southward flight appears to be through the northern Great Plains and the Mississippi Valley to the Gulf Coast. The A. O. U. Check-List summary (4th ed.: 38, 1931): "Casual on the Atlantic Coast (Maryland and North Carolina)" is, however, too restrictive. Considering the general ranges of the subspecies, it is a fair presumption that any diminutive Canada goose occurring on the Atlantic Coast is *hutchinsi*. Definite proof to the contrary would be required.

The following records accumulated in the study of bird names indicate more frequent occurrence on that seaboard than appears to be realized. Moreover, the existence of popular names for these small geese probably in most cases indicates repeated occurrence.

Locality	Reference	Local names
New Glasgow, Nova Scotia	J. B. Saunders* (*a collaborator of the Biological Survey; others marked the same)	grey-bellied goose mud goose
Cape Island, Nova Scotia	Bonnycastle Dale (Rod & Gun in Canada, 25(4): 237, 1923)	small goose little Canada
Port Joli, Nova Scotia	Bonnycastle Dale (Rod & Gun in Canada, 25(4): 237, 1923)	southern goose

Locality	Reference	Local names
Maine	J. J. Audubon (Orn. Biogr., 3: 17, 1835)	flight goose winter goose
Jonesport, Maine	E. B. Lawyer*	brant
Massachusetts Bay, Mass.	W. H. Rich (Feathered Game of the North-east: 269, 1907)	short-necked goose
Connecticut	J. H. Linsley (Catalogue of the Birds of Connecticut: 269, 1843)	southern goose
Montauk, N. Y.	J. P. Giraud (Birds of Long Island: 293, 1844)	mud goose
East Hampton, N. Y.	Irving Edwards*	mud goose
Long Island, N. Y.	S. E. Fanning*	little grey goose
Barnegat Bay, N. J.	Chas. S. Westcott (Forest & Stream, 18: 86, 1882)	little goose sedge goose
Choptank River, Md.	Harry M. Harrison*	brant
Morehead, N. C.	Gurdon Trumbull (Names and Portraits of Birds: 4, 1888)	marsh goose

There are published records unaccompanied by special local names in: Knight, O. W., Birds of Maine: 123, 1908; Forbush, E. H., Birds of Massachusetts, etc., 1: 295, 1925; Sage, Bishop, and Bliss, Birds of Connecticut: 41-42, 1913; Rives, Wm. C., Birds of the Virginias: 49, 1890; Pearson, Brimley, and Brimley, Birds of North Carolina: 49, 1942. Also an unpublished one from a correspondent, J. R. Andrews* of Cheriton, Virginia. Thus it appears that *Branta c. hutchinsi* occurs from time to time at points on the Atlantic Coast from Nova Scotia to North Carolina. There are some implications in the records that the bird was more often seen 50 to 100 years ago, but recalling recent irruption into Atlantic Coastal States by the Blue Goose, a bird having a very similar pattern of range and migration, who would care to predict that occurrences of *hutchinsi* in that region are a thing of the past?—W. L. McATEE, Chicago, Illinois.

Arkansas Kingbird in southeastern Florida.—On September 25, 1944, I saw an Arkansas Kingbird (*Tyrannus verticalis*) about a hundred yards inland from Florida's east coast along the improved road leading westward to Hypoluxo Island and the town of Lantana, Palm Beach County. I watched it for about fifteen minutes, during which time it perched on a telephone wire or on the top of one of the melaleuca trees lining the road, capturing its food along the open roadway rather than in or above the dense mangrove swamp at either side. With it, in a loose flock, were five Eastern Kingbirds (*Tyrannus tyrannus*) and four Gray Kingbirds (*Tyrannus dominicensis*). A strong east wind had been blowing for some days, and Florida had, the week before, been warned of an approaching hurricane, but I have no reason to believe that the Arkansas Kingbird had been blown in by a storm. Howell ('Florida Bird Life,' 318, 1932) considers this species "rather frequent as a straggler" and lists several records for the state. Considering the frequency with which it has been recorded recently in the East one wonders whether it may not eventually establish itself along the Atlantic coast in a region far removed from its present breeding range.—GEORGE MIKESCH SUTTON, Major, Air Corps, AAF Technical Center, Orlando, Florida.

Chestnut-collared Longspur on Long Island.—On April 1, 1944, with Jerry Soll, Walter Ferguson, and Arnold Weinberg, I had the good fortune to see a Chestnut-collared Longspur (*Calcarius ornatus*) at Dyker Heights, Brooklyn. The bird, a male in nearly complete breeding plumage, was studied at distances as close as five feet with 8x binoculars for about an hour, and a detailed observation of the plumage was obtained. The chestnut nape, black head markings, black breast and upper abdomen, and the characteristic pattern of the tail when the bird was in flight were all noted. Some vestiges of winter plumage were apparent in a few white, transverse streaks on the black underparts, the white last row of lesser wing-coverts, and the buffy streaks mingling with the black of the posterior portion of the crown.

Our observations were made on a sandy strip bordering the Belt Parkway, in which clumps of alfalfa (*Medicago sativa*) were commonly distributed, interspersed with couch-grass (*Agropyron repens*), crab grass (*Digitalia sanguinalis*), several of the fescues, and various other low-growing plants. Present in the area were Eastern Savannah Sparrows (*Passerculus sandwichensis savanna*), Eastern Song Sparrows (*Melospiza melodia melodia*), Killdeer (*Charadrius vociferus vociferus*), Prairie Horned Larks (*Otocoris alpestris praticola*) and Eastern Meadowlarks (*Sturnella magna magna*).

The longspur was discovered as we combed through the strip, flushing the various sparrows and larks. As we drew near, it walked and ran from us, crouching low and at intervals attempting concealment, at a little distance, behind a tuft of grass. When left undisturbed, the bird walked leisurely about, apparently feeding on small insects gleaned from the grass blades. I am told by Mr. John Elliott of Seaford, Long Island, who with Mr. Roy Latham of Orient, has been kind enough to diagnose the flora of the area, that the seed crop of none of the plants present had matured sufficiently to be of value, although the seeds shed the previous year are doubtless picked up from the ground at that season by the horned larks and sparrows.

We were able, several times, by surrounding the longspur and approaching it very slowly, to get within five feet of the bird and study it at leisure. At sudden noise or motion, it would flush, however, and usually circle off 75 or 100 yards, uttering a soft, slurred note, *chee-drrt*, eventually returning to the same strip, sometimes almost to the same spot from which it had taken wing. On one such excursion the longspur pursued a Killdeer for a hundred feet over a winding course with the chase terminated as abruptly as it began, by the longspur dropping suddenly into the grass.

An examination of available literature reveals that the Chestnut-collared Longspur has not been recorded from the East in the last half-century. Specimens were taken on Long Island, September 14, 1891, and February 16, 1889, according to Cruickshank ('Birds Around New York City': 475, 1942). Forbush ('Birds of Massachusetts and Other New England States': 39, 1929) lists a bird taken at Scarborough, Maine, August 13, 1886, and a male collected at Gloucester, Massachusetts, July 28, 1876. The species is of accidental occurrence, also, in Maryland (A. O. U. Check-List, fourth ed., 1931).

In addition to the foregoing published records, I have learned of an individual seen at Orient, Long Island, by Mr. Roy Latham, who has kindly extended permission to place his observations on record. Mr. Latham writes: "On April 21, 1923, I saw a bird which I identified as a nearly full-plumaged Chestnut-collared Longspur at the edge of a farm lane here in Orient. The bird was very tame and I crawled within a few feet of it as it sneaked along in the short grass. On April 27 of the same year, I saw the bird—or another of the same species—and collected the bird, which was made into a rather poor skin. I have it here somewhere now. There is no

question as to the identity of the species, and my individual is a male in at least two-thirds spring plumage.—ROBERT H. GRANT, 2415 Newkirk Avenue, Brooklyn, New York.

Interior records of brant.—In his 'Birds of the Northwest' (U. S. Geol. Surv. Terr., Misc. Publ., 3: 557, 1874) Coues said of *Branta bernicla*: "While ascending the Missouri in October 1872, I observed vast numbers of the Common Brant in flocks on the banks and mud-bars of the River." Then in the 'Report on Bird Migration in the Mississippi Valley' (U. S. Dept. Agr., Div. Econ. Orn., Bull. 2: 78, 1888) Cooke wrote: "During the winter of 1883-'84 this species was represented from Illinois southward by a few rare visitants. In the spring it was rare south of Minnesota, but by the time it reached that State its numbers had been increased by recruits from the southeast and it became almost common."

It is now possible to recognize these as among the 'growing pains' of American ornithology. From the almost pathological aversion of brant to flying over land (following all sinuosities of the coast rather than cross a headland) as reported by old hunters, it would be expected that any birds reaching the Missouri and Mississippi valleys would be mere stragglers that had been accidentally attached to flocks of other species.

Whether under the stimulus of this reflection or not, it has been realized by later ornithologists that all was not well with the early records of brant in the interior. Thus Roberts ('Birds of Minnesota,' 1: 66, 1932) relegates the brant to the hypothetical list among other birds of which there are no Minnesota specimens. DuMont ('A Revised List of the Birds of Iowa,' Univ. Iowa Studies, n. s. 268: 158, 1934) takes similar action, saying: "There are a number of observations, in each instance unsupported by specimens. Undoubtedly, some of these refer to *Branta c. hutchinsi*." Lynds Jones long before had done the same in Ohio ('Birds of Ohio': 226, 1903). Kumlien and Hollister ('Birds of Wisconsin': 30, 1903) reject all brant records except one based on a specimen taken by Dr. P. R. Hoy. This was one of three birds "from the shore of Lake Michigan." Barrows ('Michigan Bird Life': 120, 1912) found only two records (representing a total of four birds) substantiated by specimens. There is no authentic record for Illinois and none are reported for Missouri (Widmann, 1907), Arkansas (Howell, 1911), and Oklahoma (Nice, 1924). Butler ('Birds of Indiana': 639, 1897) noted one from Indiana and one from Michigan. Oberholser ('Bird Life of Louisiana,' Louis. Dept. Conserv., Bull. 28: 680, 1938) says: "The American Brant is accredited to Louisiana by several authors, but the writer fails to find an occurrence definite enough to entitle it to a place in the Louisiana list. The small races of Canada Geese and the other geese are so commonly called 'brant' in the Mississippi valley that no dependence can be placed on any records other than those of actual specimens taken."

Earlier authors also have suggested that popular misuse of the term 'brant' is responsible for much of the difficulty. As a specialist on bird names, the present writer is sure that is the case. All geese besides the Canada are widely termed brant and even the big honker is not a complete exception. Some as the Snow Goose (young), Blue Goose, and Hutchins's Goose are even called 'black brant.' Certainly the editors and readers of older volumes of sportsmen's periodicals interpreted these names in the light of eastern experience and considered these 'black brant' to be the sea brant of their acquaintance. As we have seen, far better qualified observers and writers also were 'taken in.' In fairly recent years, correspondents have reported 'Black Brant' from Wisconsin, Kentucky, Minnesota, Iowa, and North Dakota, but there is no reason to believe that these are other than misnamed. People are

still seeing true brant where they 'ain't' and it is up to the compiler to be on guard.—
W. L. McATEE, *Chicago, Illinois.*

Redhead breeding in New Brunswick.—On July 7, 1944, a brood of young Redheads (*Nyroca americana*) was found in a small slough on Middle Island in the St. John River near Maugerville, New Brunswick, by a party consisting of H. H. Ritchie, who is Chief Game Warden for New Brunswick, Provincial Warden John Campbell, and the writer. As far as can be determined, this occurrence constitutes the first authentic record of the nesting of Redheads for New Brunswick or for any of the Maritime Provinces of Canada.

The breeding area was a narrow, shallow pond, of scarcely two acres in extent situated on Middle Island. Broods of several other species of ducks were found here and included those of the Ring-necked Duck (*Nyroca collaris*), Hooded Merganser (*Lophodytes cucullatus*), Golden-eye (*Glaucionetta clangula americana*), Blue-winged Teal (*Anas discors*), and Green-winged Teal (*Anas carolinensis*). The Redhead family consisted of the female and eight downy young less than a week old.

The Redhead brood and one of the Ring-neck broods remained quite near together and were studied at close range for some time. The two species were readily identifiable and differences in the young as well as in the females were clearly apparent to all members of the party. In order to confirm the record, however, Warden Campbell and the writer returned to the area on the following day, relocated the Redheads, and collected two of the young. One of these is now in the collection of the Chief Game Warden at Fredericton, New Brunswick, and the other is in the collection of the Maine Cooperative Wildlife Research Unit at Orono, Maine.—HOWARD L. MENDALL, *Maine Cooperative Wildlife Research Unit, Orono, Maine.*

Two unusual records for North Carolina.—The finding of a dying Pomarine Jaeger (*Stercorarius pomarinus*) along the seashore of the Pea Island Wildlife Refuge, North Carolina, on October 27, 1943, by the manager, Mr. Sam A. Walker, established a new record for the refuge and added another to the few known appearances of this species in North Carolina. According to Pearson, Brimley, and Brimley, in their 'Birds of North Carolina,' up to 1942 only three records had been published for the state. The skin was presented to the North Carolina Museum.

A second new occurrence for the refuge was noted when Messrs. Walker, Thomas Dowdy, and Cecil Williams observed eight White Pelicans (*Pelecanus erythrorhynchos*) on the sound near New Inlet, April 2, 1944. When first sighted the birds were about three-quarters of a mile away and, after alighting on the water, they were approached closely enough by boat to insure definite identification. Seven records of the occurrence of this species in the state have been published since 1884, according to 'Birds of North Carolina,' with May 12 the earliest in spring.—FAXON W. COOK, *Fish and Wildlife Service, Chicago, Illinois.*

RECENT LITERATURE

A revision of the ducks.¹—In spite of the fact that the family *Anatidae* is one of the most popular and best-known of the avian world, it is remarkable how much still remains to be known of its habits, morphology and relationships. This important paper serves to emphasize this fact and to indicate how large a field of study remains to be covered. The two authors are well known for their critical taxonomic knowledge and, in the case of the senior author, for his intimate acquaintance with the behavior of these birds under wild and captive conditions. This combination gives an ideal approach towards revision of the family from the point of view of their relationships, a goal towards which taxonomy is striving.

It is interesting to compare the classification in this paper with that of Peters's 'Check List,' published 14 years ago. Peters recognizes 62 genera in the *Anatidae* of which 44, or 70 per cent, contain only one species. Delacour and Mayr recognize 40 genera of which 22, or only 55 per cent, are monotypic. The reduction in the number of genera recognized amounts to 36 per cent. This is a considerable saving in numbers of names to be remembered. The reduction of species is by no means so sweeping, however. This is partly due to the inherent distinctness of most species of ducks, partly to the overlapping widespread ranges of many forms. Peters recognizes 167 species, the present authors 144, a reduction of only 14 per cent. I am sorry that this paper does not list all the currently recognized subspecies as this would have added considerably to its completeness.

The arrangement of subfamily groups and genera seems ideal to this writer. Where monotypic genera are used, as in the case of *Coscoroba*, an attempt is made to indicate that this represents a transitional stage of relationship between two groups or tribes, in this case the *Anserini* and the *Dendrocygnini*. Only nine monotypic forms are retained because of their anomalous characters. Some species currently assigned to certain groups are open to discussion, a fact well recognized by the authors. I should be inclined to put the steamer ducks in with the *Cairinini* rather than with the *Tadornini*. Another species, the African black duck (*Anas sparsa*), by disposition, by its wing knob, and by its plumage pattern about the neck, seems to me to resemble the *Tadornini*. Possibly it is a link between the *Anatini* and the sheldrakes. There are always points for discussion in a paper such as this which make it stimulating to further observation and study.

In the list of genera and species (pp. 37-42) a bracket sign is used to indicate superspecies. The use of superspecies here and in other family or regional lists presents some difficulties. By definition superspecies must include only species which replace each other geographically. And yet many forms of ducks are apparently most closely related to forms with which they share overlapping territory. Thus if superspecies are used to express degrees of relationship, the proper picture is not always clearly presented, or may even be somewhat distorted. Thus, for example, in the *Dendrocygnini*, *Dendrocygna bicolor* and *D. arcuata* are indicated as comprising a superspecies, and yet *D. javanica*, which apparently overlaps the range of both, is actually the perfect intermediate species between the two. Again, on p. 39, in the arrangement of the *Anas castanea* group, *gibberifrons* and *bernieri* are put together as a superspecies while *castanea* is bracketed with *aucklandica*. Actually, as far as relationship is concerned, *castanea* and *gibberifrons* would be conspecific

¹ DELACOUR, JEAN, AND MAYR, ERNST. 'The family Anatidae.' The Wilson Bulletin, 57, (no. 1): 3-55, 1 pl., 24 figs., March, 1945.

were it not for the fact that (probably in rather recent historic time) their breeding ranges apparently overlap. Of the four species listed, these two are the closest in relationship and yet they cannot be so indicated except in the unsatisfactory and arbitrary form of simple linear arrangement, particularly unsatisfactory in the case of a large genus like *Anas* which contains 36 species.

One of the particularly noteworthy contributions of this paper is the close correlation made between morphological and behavioristic characters in the detailed classification of the family. It is to be hoped that, wherever possible, taxonomists will take behavior patterns into account in such studies. Especially valuable are the comments on display flights, a little understood and somewhat misinterpreted phenomenon. In the section on food habits (p. 50) I would question the statement that regular diving for food does not occur in the tribe *Analini*. I have observed Black Ducks, *Anas fulvigula*, dive regularly and persistently for food in deep water.

The illustrations consist of many valuable text-figures, particularly of some of the less-known downy plumages. A well-colored but definitely emaciated Formosa Teal is the subject of the frontispiece. The chart, Table 1., of sub-familial characters is particularly valuable. It is to be hoped that this paper will serve to encourage interest in working out some of the many problems still to be resolved in this fascinating family.—S. D. RIPLEY.

Georgia birds.¹—This little volume fills a long-open gap in the roster of state bird lists for, except for a nominal list prepared by John LeConte in 1849, there has been no state-wide account of the birds of Georgia. That there have been many active ornithologists in the state and many important contributions to the ornithology of the region is without question, as may be ascertained by a glance at the historical narrative by Dr. Murphey and the annotated bibliography at the close of the volume. The present publication summarizes the knowledge of the occurrence and local distribution of each of the 377 species and subspecies definitely recorded from Georgia and 23 others whose uncertainty has placed them in a hypothetical list. The forms whose status depends on few or unusual records are documented or discussed at greater length.

Dr. Murphey has given short sketches of the work of the various individuals whose efforts through the years have made possible the accumulation of the data on which the present check-list is based, thus making an excellent historical summary of Georgia ornithology. The bibliography occupies thirty-two pages and is rendered particularly useful by numerous explanatory notes. Local bird clubs and local lists are tabulated separately, and a map of the state, with explanatory notes, is added.

There is still much to be done, no doubt, in the study of Georgia bird life, as there is in many other parts of the country, but the present check-list furnishes an excellent foundation on which future distributional studies may be based. The authors and the Georgia Ornithological Society, under whose sponsorship the booklet was prepared as Occasional Publication no. 2 of the Society, have rendered useful service in the issue of the check-list.—J. T. ZIMMER.

California birds.²—This important work was commenced by Grinnell in 1934 and was half-completed at his death in 1939. Dr. Miller then took up the task and

¹ GREENE, EARLE R.; GRIFFIN, WILLIAM W.; ODUM, EUGENE P.; STODDARD, HERBERT L.; AND TOMKINS, IVAN R. 'Birds of Georgia. A preliminary check-list and bibliography of Georgia ornithology. With a historical narrative by Eugene E. Murphey.' 8vo, 111 pp., frontisp., map. University of Georgia Press, Athens, Georgia, 1945. Price \$2.00.

² GRINNELL, JOSEPH, AND MILLER, ALDEN H. 'The Distribution of the Birds of California.' Pacific Coast Avifauna, No. 27, 4to, 608 pp., frontisp. (col.), figs. 1-57, 1945. Cooper Ornithological Club, Berkeley, California. Price \$10.00.

carried it to its successful conclusion, revising and bringing up to date the earlier portion to give uniformity to the whole.

The long list of California birds is taken up by species and subspecies following a preliminary check-list in which common names are provided for all the species as well as the subspecies (as is proposed for the next edition of the A. O. U. Check-List). A list of synonyms under each form in the general text gives the different scientific and vernacular names by which it has been known in California, and a statement of the general status of abundance and seasonal occurrence follows.

The geographic range of each form within the state is given in detail, often with the specified localities of record or, in some cases, the general regions, only. These are well-documented, not necessarily credited to the first recorder but, rather, to the most adequate reference. A general discussion of range and distribution in California, and sometimes extraliminally, introduces this paragraph.

A following paragraph discusses the habitats frequented by the bird in question, often with information as to its behavior, food, or other characteristics. Fifty-seven distributional maps show the positions of the localities of record and those from which material has been examined. These cover most of the species which have more than one Californian subspecies. This paragraph brings the knowledge of the local distribution up to date, and although future investigations may necessitate some alterations in minor details, there appears to be little likelihood of significant changes. Debatable records are discarded or discussed, and if the Californian status is entirely dependent on such records, the form is relegated to the hypothetical list at the end of the volume where appropriate comments are given.

Dr. Miller has taken the opportunity to accept or reject a number of proposals on classification although no detailed taxonomic discussions are given. The vernacular nomenclature follows the plan, long ago advocated by Dr. Grinnell, of incorporating the name of the species in that of the subspecies. This has resulted in some very cumbersome names that are likely to be abbreviated in ordinary usage except in formal written accounts where the scientific trinomials will serve the purpose better. The system does not accomplish all that is claimed for it in any case for, while it may show that the "Western Red-tailed Hawk" and the "Harlan Red-tailed Hawk" are conspecies, it fails to do so for the "Common Rough-legged Hawk" and the "Ferruginous Rough-legged Hawk" which are not. Many familiar names are supplanted by new combinations and in case of future altered views as to certain relationships, other changes will be necessary. Since vernacular names are not subject to the rules governing scientific names and are not even allowable as criteria on which the identity of a scientific name may be based, the need for the proposed changes is not clearly apparent.

The matter of vernacular names does not, however, affect the great value of the distributional data which furnish the real text of the book. Publication is promised of another volume dealing with a number of distributional factors that are not treated in the present work. The appearance of this future volume will be awaited with interest.—J. T. ZIMMER.

General Ornithology.—Professor Hann has prepared these two books primarily for the use of college students taking his course of ornithology at the University of Michigan, but they should prove useful to amateur ornithologists in general, and the

¹ HANN, HARRY W. 'An introduction to ornithology.' 4to (lithoprinted), 6 pp. + XVIII + 279, numerous figs., 1945. Ann Arbor, Michigan. Price \$3.25.

HANN, HARRY W. 'Ornithology Notebook.' 4to (lithoprinted; loose-leaf), [V] + 45, 2 figs., 1945. Ann Arbor, Michigan. Price \$1.25.

author is pleased to offer them to interested persons who desire to purchase them at the prices given.

The 'Introduction to Ornithology' gives first a summary of the biological characteristics of birds and other general facts of interest (pp. 1-XVIII). Part 2 (pp. 1-251) is devoted to a résumé of the birds of the world, with emphasis on North American species. The orders and suborders, or some of their principal families, are described briefly as to characteristics and, often, behavior and frequently some outstanding members of the family are further discussed. If the family is, at least in part, North American, the examples are taken from this country; the discussions thus embrace a large part of the North American avifauna. A very useful feature is the inclusion of a great number of distributional maps of certain species and their subspecies with specific winter ranges usually added.

The "Notebook" (loose-leaf) is designed for laboratory and homework and gives outlines for projected study with numerous queries and accompanying blanks to be filled out by the student. Sixteen check-lists of Michigan birds are included for use on field trips and for semester records.

The two publications seem well-adapted for their intended purpose and could also be used satisfactorily for home study by those interested who do not have opportunities to attend a school where courses in ornithology are given.—J. T. ZIMMER.

Birds of Timor and Sumba.¹—This paper leaves little to be added to our taxonomic knowledge of the avifauna of Timor and Sumba. Mayr has presented a masterful analysis of the birds and their origin, quite up to his usual standard of excellence.

The paper is divided into the following seven main headings which show the scope of the paper: The Birds of Timor; The Birds of Sumba; Taxonomic Notes on the Birds of Timor and Sumba; Altitudinal variation on Timor; Notes on the Zoögeography of Timor and Sumba.

Timor was explored ornithologically as early as 1801, and collected on at intervals until Stein's visit, on whose collections Mayr's paper is based. In spite of Timor's long ornithological history, Stein was able to add no less than 25 species and subspecies to the Timor list of which 17 are resident. The total now known from the island is 176 species and subspecies, including 31 migrants.

In spite of its 32,000 square kilometers, Timor has a poor avifauna due to its great aridity and peripheral position. It is, however, no exception to the distributional pattern of other elongated islands of the East Indies, for it shows marked faunistic differences between its eastern and western ends.

Unlike Timor, Sumba was one of the last East Indian Islands to be explored ornithologically. The first collection was made there by Reidel in 1880. Since then numerous other collections have been made and when Stein visited the island he was able to add only 13 new birds to the Sumba list. Of these, eight were winter visitors and one of the remaining five was endemic to that island. To date, 129 species and subspecies are known from the island.

Sumba, lying about 20 miles south of Flores, supports an avifauna very similar to that of the latter. On account of the dry climate and lack of rain forest the avifauna is poorer. There is no very marked endemism on either Sumba or Timor.

The paper is accompanied by four interesting distributional maps. Nineteen new subspecies are described. They are:—*Synoicus ypsilophorus castaneus* (Alor I.), *Ducula aenea pallidinucha* (Tobea I., Buton Strait), *Ducula cineracea schistacea*

See

¹ MAYR, ERNST. 'The Birds of Timor and Sumba.' Bull. Amer. Mus. Nat. Hist., 83 (Art. 2): 123-194, figs. 1-4, July 11, 1944.

(Weten I.), *Tanygnathus megalorhynchus hellmayri* (Timor I.), *Caprimulgus affinis undulatus* (Flores I.), *Caprimulgus affinis timorensis* (Timor I.), *Collocalia esculenta perneglecta* (Water I.), *Mirafra javanica timorensis* (Timor I.), *Turdus poliocephalus sterlingi* (Timor I.), *Saxicola caprata cognata* (Babar I.), *Pnoepyga pusilla timorensis* (Timor I.), *Bradypterus montis timorensis* (Timor I.), *Seicercus montis paulinae* (Timor I.), *Dendrobastes hyperythrus clarae* (Timor I.), *Monarcha cinerascens brunneus* (Great Banda I.), *Philemon inornatus robustus* (Timor I.), *Piprisoma obsoletum tinctum* (Sumba I.), *Zosterops montana steini* (Timor I.), and *Lonchura punctulata sumbae* (Sumba I.).

Birds of Brazil.¹—This volume supplements an earlier one, published in the *Revista de Museu Paulista*, 22: I–XVIII, 1–566, 1938, and completes this valuable catalogue. The present part contains the Tyrannoidea and Passeres.

Dr. Pinto has at his command the extensive collections of birds of his native country that are preserved in the Department of Zoology of the Secretariat of Agriculture (formerly the Section of Zoology of the Museu Paulista) and his own field experience in various parts of Brazil. He has thus been enabled to examine critically a large part of the native avifauna and to express studied opinions on much of the remainder. The result is shown in the amount of information presented in this work.

Bibliographic references are limited to those of the original description of the accepted name and synonyms and to various combinations, with some additional citations, but notation is made of the volume and page in Hellmayr's 'Catalogue of the Birds of the Americas' where fuller bibliographies are given. The first part gave similar reference to the 'Catalogue of Birds in the British Museum.' The distribution of each subspecies or monotypic species is detailed, including extralimital localities. This is followed by a list of the material preserved in the collection, with full data.

In the extensive footnotes are given many critical notes on the taxonomy and distribution of certain forms. They are thoroughly documented and supply much useful information, sometimes revisory in character. No new forms are described, but one new name is proposed—*Neopelma aurifrons chrysolophum* to replace *Muscicapula luteocephala* Lafresnaye (incorrectly cited as "*Neopelma*" *luteocephala*) which Dr. Pinto has been able to recognize (with which the reviewer agrees) as distinct from typical *aurifrons*.

The plates (by T. G. Meissner) are interesting and useful and give representations of 59 species and subspecies, some of which, at least, have not been adequately, if at all, figured heretofore.

Dr. Pinto is to be congratulated on the successful completion of a long task. Students of Neotropical birds will find the catalogue most useful, both as a comprehensive statement of the status of Brazilian birds and as a foundation for future work.—J. T. ZIMMER.

Prairie Chicken studies.²—Mr. Schwartz has given the results of extensive studies of the Prairie Chicken in Missouri, begun in December, 1938, and continued for five years, with the addition of some data subsequently acquired. It is a thorough account of the various activities of the species, the conditions governing its distribution in the state, and suggestions for its management.

¹ PINTO, OLIVÉRIO MÁRIO DE OLIVEIRA. 'Catálogo das Aves do Brasil. 2. a. Parte.' Royal 8vo. XI + 700, 15 pls. (5 col.), 1944. Dept. Zool., Secy. Agr., Industr. e Comércio, São Paulo, Brasil.

² SCHWARTZ, CHARLES W. 'The Ecology of the Prairie Chicken in Missouri.' University of Missouri Studies, 20 (1): 1–99, 16 pls., figs. 1–4, 8 fold. maps, 1945. University of Missouri, Columbia, Mo. Price \$1.50.

The discussion of the birds' behavior on the 'booming' grounds is particularly detailed and brings out numerous facts that have received little or no attention heretofore. The interesting possibility is suggested that young males of the year may take part in the activities on the 'booming' grounds during the autumn display. Definite territories on the grounds were found to be established and individual birds were noted on the same territory on successive days, although the boundaries were somewhat flexible and were not maintained whenever an occupant temporarily left his holdings. The autumn grounds are fewer in number than those of the spring although part of the spring grounds make up the autumn areas. The same grounds may be used over a period of years—in one known case for 40 years—although various conditions may cause a change.

The Missouri population is at present on the decline as it has been before, since there is a periodic fluctuation shared by various other birds and animals. Correlations are made between the birds' distribution and soil types although no direct connection is claimed other than that which is related to agricultural land use. Moderately poor soil, less fit for cultivation, thus favors a larger grouse population. The birds are absent from 86 per cent of the potential range within the state.

Foods are tabulated, showing a great preponderance of vegetable matter from September through April, but only about 60 per cent at other times. Mortality factors are discussed with the conclusion that illegal hunting and unfavorable agricultural practices are the principal deleterious factors.

The plates contain 32 fine photographs of the Prairie Chicken and its local habitats. With the exception of five they do not duplicate those of the earlier volume of pictures by Mr. Schwartz, 'The Prairie Chicken in Missouri,' published by the Missouri Conservation Commission in 1944.

Naturalists and others interested in one of America's fine game birds will find much valuable information in this excellent report.—J. T. ZIMMER.

PERIODICAL LITERATURE

- ABRAHAM, J. A. A Royal Blue Parrot Finch hybrid. *Avic. Mag.*, (5) 10 (1): 21-24, Jan.-Feb., 1945.
- ADAMS, IVERS S. Arrival and departure of Greater Snow Geese in Quebec. *Bird-Banding*, 16 (1): 36-37, Jan., 1945.
- ALDOUS, SHALER E. Winter habits of crows in Oklahoma. *Jour. Wildl. Manage.*, 8 (4): 290-295, fig. 1, Oct., 1944.
- ALEXANDER, H. G. Acquired feeding-habit of Black-headed Gull. *Brit. Birds*, 38 (10): 198, Mar. 1, 1945.
- ALEXANDER, W. B.; SOUTHERN, H. N.; TUCKER, B. W., AND WATSON, J. S. Observations on the breeding birds of Lundy in 1942. *Brit. Birds*, 38 (10): 182-191, 1 fig., Mar. 1, 1945.
- ALLEN, FRANCIS H. Ornithologists alive! III. Winsor Marrett Tyler. *Bull. Mass. Aud. Soc.*, 29 (1): 15-16, 1 fig., Feb., 1945.—A biographical sketch.
- ALLERT, O. P. A 1931 Avocet record for Burlington. *Iowa Bird Life*, 15 (1): 12, Mar., 1945.
- AMADON, D. Birding in Hawaii National Park. *Elepaio (mimeogr.)*, 5 (9): 55-56, Mar., 1945.
- AMADON, DEAN. The bird collection of the Bishop Museum, Honolulu. *Elepaio (mimeogr.)*, 5 (6): 38-40, Dec., 1944.
- AMMANN, GEORGE A. Determining the age of Pinnated and Sharp-tailed Grouse. *Jour. Wildl. Manage.*, 8 (2): 170-171, pl. 9, Apr., 1944.

- AMSLER, MAURICE. Memories of happy days. *Avic. Mag.*, Jubilee Suppl.: 38-44, Nov., 1944.
- ANDERSON, C. C., AND SORENSON, J. H. Chronic osteomyelitis occurring in *Emeus crassus*. *Trans. Roy. Soc. New Zeal.*, **74** (part 2): 182-184, pls. 22-23 (figs. 1-6), Sept. 1944.
- ANONYMOUS. Annual report 1944. *News from Bird-Banders* (mimeogr.), **20** (1): 7-11, Mar., 1945.
- ANONYMOUS. Another cuckoo fallacy. *Victorian Nat.*, **61** (10): 182, Feb., 1945.
- ANONYMOUS. Birds to look for month by month. *Bull. Schenectady Bird Club*, no. 4: 13 pages, Feb., 1945.
- ANONYMOUS. Birds v. aircraft. *Victorian Nat.*, **61** (10): 182, Feb., 1945.
- ANONYMOUS. Nature conservation and nature reserves. Report of the committee appointed by Council on 26 May 1942. *Jour. Ecol.*, **32** (1): 45-82, May, 1944.
- ANONYMOUS. Officers of the Avicultural Society past and present. *Avic. Mag.*, Jubilee Suppl., 18-20, 4 pls., Nov., 1944.
- ANTHONY, EFFIE. Redpolls bathing in the snow. *Maine Aud. Soc. Bull.* (mimeogr.), **1** (2): 42-43, Apr., 1945.
- ARNOLD, E. C. Dipper in Sussex. *Brit. Birds*, **38** (10): 194, Mar. 1, 1945.
- AUSTIN, OLIVER L. The role of longevity in successful breeding by the Common Tern (*Sterna hirundo*). *Bird-Banding*, **16** (1): 21-28, Jan., 1945.
- AUSTIN, OLIVER L. The status of Tern Island and the Cape Cod terns in 1943. *Bird-Banding*, **15** (4): 133-139, Oct., 1944.
- BACIGALUPO, JUAN. Notas sobre la evolucion del "*Plasmodium gallinaceum*" Brumpt, 1935. *Rev. Soc. Argentina Biol.*, **20** (7): 521-528, figs. 1-3, Nov., 1944.
- BACIGALUPO, JUAN, AND LIFSCHITZ, JORGE. Consideraciones sobre el *Plasmodium gallinaceum*, Brumpt, 1935. *Rev. Soc. Argentina Biol.*, **20** (7): 506-520, figs. 1-8, Nov., 1944.
- BAILLIE, JAMES L., JR. Charles Fothergill (1782-1840). *Can. Hist. Rev.*, **25**: 376-396, 1 pl., Dec., 1944.—A biographical sketch.
- BAILLIE, JAMES L., JR. The world's champion long-distance flier [Arctic Tern]. *Canad. Nat.*, **6** (4): 132-133, 3 figs., Sept.-Oct., 1944.
- BALL, R. F. The effect of the ration upon iris color of Single Comb White Leghorns. *Poultry Sci.*, **23** (5): 377-385, fig. 1, Sept., 1944.
- BALL, R. F., AND HUTT, F. B. A spontaneous fibrosarcoma in a thirteen-day-old chick. *Cornell Vet.*, **34** (3): 254-256, fig. 1, July, 1944.
- BARCLAY-SMITH, PHYLLIS. The place of aviculture in ornithology. *Avic. Mag.*, Jubilee Suppl.: 34-37, Nov., 1944.
- BARKER, BYRON W. A nest of the Yellow Palm Warbler in the Bangor bog. *Maine Aud. Soc. Bull.* (mimeogr.), **1** (2): 42, Apr., 1945.
- BARNARD, K. H. William Lutley Sclater. *Samab* (S. African Mus. Assoc.), **7** (3): 213-216, 1 fig., Sept., 1944.
- BARRUEL, P. Nidification d'oiseaux dans Paris. *L'Oiseau et Rev. Franc. d'Orn.*, (n. s.) **13**: 103-105, 1943.
- BARRUEL, P. L. Note sur la capture dans les Basses-Pyrénées d'un jeune male de Gobe-mouche Narcisse *Xanthopygia narcissina narcissina* (Temm.). *L'Oiseau et Rev. Franc. d'Orn.*, (n. s.) **13**: 1-4, 1 pl. (col.), 1943.
- BARRUEL, P. Observations sur quelques espèces d'oiseaux de mer des côtes du Finistère. *L'Oiseau et Rev. Franc. d'Orn.*, (n. s.) **12** (2, 3, 4): 73-80, 1 pl. (col.), 1942.
- BARRUEL, P. Présence exceptionnelle d'oiseaux aquatiques en Seine-et-Marne. *L'Oiseau et Rev. Franc. d'Orn.*, (n. s.) **12** (1): 66-68, 1942.

- BAUMGARTNER, F. M. Dispersal and survival of game farm Bobwhite Quail in northcentral Oklahoma. *Jour. Wildl. Manage.*, 8 (2): 112-118, fig. 1, Apr., 1944.
- BENSON, C. W. Observations from Transvaal, Natal, and Southern Rhodesia. *Ostrich*, 15 (3): 213-221, Nov., 1944.
- BENSON, C. W. Some new records from Nyasaland. *Bull. Brit. Ornith. Club*, 65 (455): 17-18, Feb. 23, 1945.
- BENSON, C. W. The Madagascar Martin from Nyasaland. *Bull. Brit. Ornith. Club*, 65 (no. 454): 4-5, Nov. 24, 1944.
- BERLIOZ, J. Considérations sur les variations pigmentaires des Mesanges Charbonnières (*Parus major*) en extrême-orient. *L'Oiseau et Rev. Franç. d'Orn.*, (n. s.) 12 (2, 3, 4): 107-120, 1942.
- BERLIOZ, J. A propos d'une rare espèce de Mniotiltidés. *Vermivora crissalis* (Salv. et Godm.). *L'Oiseau et Rev. Franç. d'Orn.*, (n. s.) 12 (1): 68-69, 1942.
- BERLIOZ, J. Étude critique des Trochilidés du genre *Lampornis* Swainson. *L'Oiseau et Rev. Franç. d'Orn.*, (n. s.) 13: 74-87, 1943.
- BERLIOZ, J. Une capture d'Épervier dans Paris. *L'Oiseau et Rev. Franç. d'Orn.*, (n. s.) 13: 98-100, 1943.
- BERLIOZ, J., AND JOUANIN, CHR. Révision critique des Trochilidés du genre *Oreotrochilus*. *L'Oiseau et Rev. Franç. d'Orn.*, (n. s.) 12 (1): 1-13, 1 pl. (col.), 1942.
- BERRY, JOHN. Artificial goose nests again. Further observations on the breeding psychology of wild geese. *Avic. Mag.*, (5) 9 (4): 75-79, 2 figs., July-Aug., 1944.
- BEVEN, G. Rudd's Bush-Warbler (*Apalis ruddi*). *Ostrich*, 15 (3): 178-187, 5 figs., Nov., 1944.
- BISSONNETTE, THOMAS HUME. A four-winged cock-pheasant. *Bird-Banding*, 15 (4): 145-150, 5 figs., Oct., 1944.
- BOEHM, ERHARD F. Notes on the pterylography of the Australian Raven. *Emu*, 44 (3): 230-231, Jan. 12, 1945.
- BOND, JAMES. Additional notes on West Indian birds. *Not. Nat.*, no. 148: 1-4, Mar. 9, 1945.—*Columbigallina passerina volitans* (Little Inagua, Bahama Is.), new subspecies.
- BOND, JAMES, AND DE SCHAUENSEE, RODOLPHE MEYER. Results of the Fifth George Vanderbilt Expedition 1941. The birds. *Acad. Nat. Sci. Phila.*, Monographs, no. 6: 7-56, Aug. 25, 1944.—*Lophortyx douglasii vanderbilti* (Maria Madre, Tres Marias Islands, Mex.), new subspecies.
- BOND, JAMES. Rare birds of Ship Harbor. *Maine Aud. Soc. Bull.* (mimeogr.), 1 (2): 31-32, Apr., 1945.
- BOOSEY, EDWARD. 1944 breeding season at Keston. *Avic. Mag.*, (5) 10 (1): 1-7, 2 figs., Jan.-Feb., 1945.
- BOOSEY, EDWARD. Colouration of Kookaburras. *Avic. Mag.*, (5) 9 (6): 150, Nov.-Dec., 1944.
- BOOTH, ERNEST. S. Flicker eating grapes. *Murrelet*, 25 (3): 44, Sept.-Dec., 1944.
- BOUËT, G. Les oiseaux de la forêt du sud Cameroun (cont.). *L'Oiseau et Rev. Franç. d'Orn.*, (n. s.) 12 (1): 27-51, 1942.
- BOUËT, G. Les oiseaux de la forêt du sud Cameroun (concl.). *L'Oiseau et Rev. Franç. d'Orn.*, (n. s.) 12 (2, 3, 4): 133-178, 1 map, 1942.
- BOUËT, G. Les premières recherches ornithologiques au Sénégal faites par Michel Adanson. *L'Oiseau et Rev. Franç. d'Orn.*, (n. s.) 13: 9-28, 1943.
- BOYD, A. W. Herons swimming. *Brit. Birds*, 38 (11): 216-217, Apr. 3, 1945.
- BRANT, IRVING. Voters! To the rescue of the waterfowl. *Emergency Conserv. Comm.*, no. 91: 1-6, Jan., 1945.

- BRICE, MAJOR RICHARD T., AND CRANDALL, LEE S. Birds among the coconuts. *Animal Kingdom*, 48 (2): 32-43, 4 figs., Mar.-Apr., 1945.
- BRIMLEY, H. H. Some notes on Gilbert White's "Natural History of Selborne." Part III. *Chat*, 9 (2): 27-29, Mar., 1945.
- BROOKS, MAURICE. Electronics as a possible aid in the study of bird flight and migration. *Science*, 101 (no. 2622): 329, Mar. 30, 1945.
- BROWN, LESLIE H. Nightjars of Africa and South America. *Field*, 185 (no. 4803): 39, 3 figs., Jan. 13, 1945.
- BROWN, PHILIP E. Observations on a Scaup-Duck and brood on the Lincolnshire coast. *Brit. Birds*, 38 (10): 192-193, Mar. 1, 1945.
- G BROWN, R. H. Herring-Gull feeding independent young. *Brit. Birds*, 38 (11): 217-218, Apr. 3, 1945.
- BROWN, ROYAL. Hummingbird maneuvers. *Bull. Mass. Aud. Soc.*, 29 (1): 20, Feb., 1945.
- BRYANT, C. E. Notes on the Olive-backed Oriole. *Victorian Nat.*, 61 (10): 172-175, pl. 7, Feb., 1945.
- G BRYANT, C. E. Silver Gulls breeding near Melbourne. *Emu*, 44 (3): 200-201, pl. 29, Jan. 12, 1945.
- BUCHHEISTER, CARL W. An island waiting. *Maine Aud. Soc. Bull. (mimeogr.)*, 1 (2): 37-38, Apr., 1945.
- BULLEN, EDWARD R. Bullfinch's method of feeding. *Brit. Birds*, 38 (11): 211, Apr. 3, 1945.
- BURDICK, AUSTIN W. Field identification of Brewer's Blackbirds. *Migrant*, 15 (4): 67-68, Dec., 1944.
- BURLIGH, THOMAS D. The bird life of the Gulf coast region of Mississippi. *Occ. Pap. Mus. Zool., La. State Univ.*, no. 20: 329-490, figs. 1-3, Dec. 30, 1944.
- BURNETT, FRANCES. Birding at Matinicus, Maine. *Maine Aud. Soc. Bull. (mimeogr.)*, 1 (2): 28-29, Apr., 1945.
- CANTLIN, HAROLD T. The Christmas bird count. *Elepaio (mimeogr.)*, 5 (8): 51-52, Feb., 1945.
- CARIDOIT, F. Différence d'action du benzoate d'oestradiol et du dipropionate d'oestradiol chez les oiseaux et chez les mammifères. *Comptes Rendus Soc. Biol. (facsim. ed.)*, 138 (3, 4): 97-98, 1944.
- CARRIKER, M. A., JR. Studies in neotropical mallophaga (III). *Proc. U. S. Nat. Mus.*, 95 (3180): 81-233, figs. 1-29, 1944.
- CARTWRIGHT, B. W. The "crash" decline in Sharp-tailed Grouse and Hungarian Partridge in western Canada and the role of the predator. *Trans. Ninth N. Amer. Wildl. Conf.*: 324-330, maps 1-2, 1944.
- CHAFFER, NORMAN. The Spotted and Satin Bower-birds: a comparison. *Emu*, 44 (3): 161-181, pls. 25-27, Jan. 12, 1945.
- CHAMBERLAIN, B. RHETT. Early bird prints and bird lore. *Chat*, 9 (2): 24-27, Mar., 1945.
- CHEATUM, E. L., AND BENSON, DIRCK. Effects of lead poisoning on reproduction of Mallard drakes. *Jour. Wildl. Manage.*, 9 (1): 26-29, Jan., 1945.
- CHISHOLM, A. H. Birds of the Gilbert diary. Part 2. *Emu*, 44 (3): 183-200, pl. 28, Jan. 12, 1945.
- CLANCEY, P. A. Winter Sky-Larks from Wiltshire. *Bull. Brit. Ornith. Club*, 64 (no. 453): 60-61, July 28, 1944.
- CLARKE, C. H. D. Gleanings from the natural history of Huron County, Ontario. *Canad. Field-Nat.*, 58 (3): 82-84, May-June, 1944.

- CLARKE, C. H. D. Notes on the status and distribution of certain mammals and birds in the Mackenzie River and western Arctic area in 1942 and 1943. *Canad. Field-Nat.*, 58 (3): 97-103, May-June, 1944.
- COCKCROFT, SYD; EDWARDS, GEORGE; ET AL. Nesting sites of the Ring-Ouzel. *Brit. Birds*, 38 (11): 215-216, Apr. 3, 1945.
- COGGESHALL, L. T.; PORTER, R. J.; AND LAIRD, R. L. Prophylactic and curative effects of certain sulfonamide compounds on exoerythrocytic stages in *Plasmodium gallinaceum malaria*. *Proc. Soc. Exper. Biol. and Med.*, 57 (2): 286-292, Nov., 1944.
- COGSWELL, HOWARD L. Recent birding on Oahu yields interesting records. *Elepaio*, (mimeogr.), 5 (8): 52-54, Feb., 1945.
- COLE, ARCH E. The song-production mechanism of birds. *Kentucky Warbler*, 21 (2): 17-27, figs. 1-4, Spring, 1945.
- COLEMAN, EDITH. Further remarks on herbs and birds. *Victorian Nat.*, 61 (9): 155-159, pl. 6, Jan. 5, 1945.
- COLEMAN, EDITH. Further remarks on herbs and birds. Part II.—Magical use of leaves. *Victorian Nat.*, 61 (10): 169-171, Feb., 1945.
- COLEMAN, W. W. To Churchill for birds of the Barrens. *Maryland*, 15 (1): 3-15, 13 figs., Jan., 1945.
- COLLINS, HENRY B., JR.; CLARK, AUSTIN H.; AND WALKER, EGBERT H. The Aleutian Islands: their people and natural history (with keys for the identification of the birds and plants). *Smiths. Inst. War Background Stud.*, no. 21 (3775): 1-131, figs. 1-8, pls. 1-21, Feb. 5, 1945.
- CONDON, H. T. Prions or Whale-birds (Genus *Pachyptila*) in South Australia. *So. Austral. Ornith.*, 17 (4): 38-42, Dec., 1944.
- COOKE, MAY THACHER. Returns from banded birds: some interesting recoveries. *Bird-Banding*, 16 (1): 15-21, Jan., 1945.
- CORNING, MRS. JOHN W. Birds at high altitudes (cont.). *Maine Aud. Soc. Bull.* (mimeogr.), 1 (2): 33-36, Apr., 1945.
- COTTAM, CLARENCE. The role of impoundments in postwar planning for waterfowl. *Trans. Ninth N. Amer. Wildl. Conf.*: 288-295, 1944.
- COTTAM, CLARENCE. The Ruddy Turnstone in Utah. *Condor*, 47 (2): 79, Mar.-Apr., 1945.
- COWAN, I. Mc T. The House Finch (*Carpodacus mexicanus*) in Alberta. *Murrelet*, 25 (3): 45, Sept.-Dec., 1944.
- CRANDALL, LEE S. Aviculture in America. *Avic. Mag.*, Jubilee Suppl.: 14-15, Nov., 1944.
- CROUCH, W. E. Law enforcement in the waterfowl program. *Trans. Ninth N. Amer. Wildl. Conf.*: 270-272, 1944.
- CURTIS, ROBERT A. A casual glimpse of the winter birds of our seacoast. *Bull. Aud. Soc. New Hampshire*, 15 (4): 133-135, Dec., 1944.
- DAVEY, WINTHROP N., AND DAVEY, JAMES R. Hovering and backward flight in the hummingbird. *Jack-Pine Warbler*, 23 (1): 1-7, pls. 1-2 (figs. 1-4), Jan., 1945.
- DAVIS, DAVID E. The occurrence of burst atretic follicles in birds. *Anat. Rec.*, 90 (4): 307-309, Dec., 1944.
- DAVIS, MALCOLM. Strange birds. *Aviculture*, (4) 14 (6): 227, Nov.-Dec., 1944.
- DAVIS, SIR GODFREY. Whistling schoolboys. *Avic. Mag.*, (5) 9 (6): 140-141, Nov.-Dec., 1944.
- DAY, ALBERT M. Control of waterfowl depredations. *Trans. Ninth N. Amer. Wildl. Conf.*: 281-287, 1944.

- DELACOUR, JEAN. Avicultural entente cordiale. *Avic. Mag.*, Jubilee Suppl.: 5-10, Nov., 1944.
- DELACOUR, J. Parrot breeding in the south western United States. *Avic. Mag.*, (5) 10 (1): 19-21, Jan.-Feb., 1945.
- DELACOUR, J. The fate of the Trumpeter Swan. *Avic. Mag.*, (5) 9 (6): 127-132, 1 pl., Nov.-Dec., 1944.
- DE SCHAUENSEE, RODOLPHE MEYER. Notes on Colombian birds. *Proc. Acad. Nat. Sci. Phila.*, 97 (1445): 1-16, figs. 1-2, Mar. 7, 1945.—*Adelomyia melanogenys connectens* (La Candela, Huila), *Ramphastos ambiguus brevis* (Rio Mechengue, Cauca), new subspecies.
- DICKINSON, J. C., JR. Addenda to the list of birds of Alachua County, Florida. II. *Proc. Fla. Acad. Sci.*, 7 (2-3): 191-192, June-Sept., 1944.
- DU SHANE, GRAHAM P. The embryology of vertebrate pigment cells. Part II. Birds. *Quart. Rev. Biol.*, 19 (2): 98-117, figs. 1-4, pl. 1 (figs. 5-9), June, 1944.
- EAVES, W. L. Breeding of the Plum-head Parrakeet (*Psittacula cyanocephala*). *Avic. Mag.*, (5) 10 (1): 14-15, Jan.-Feb., 1945.
- EDELSTAM, CARL. Beijershamnsområdet på Öland en ornitologisk inventering. *Skrifter I Naturskyddsarenden*, 45: 1-48, pls. 1-2, Oct. 4, 1944.
- EDWARDS, GEORGE R. Parties of Knots inland in Yorkshire. *Brit. Birds*, 38 (10): 197-198, Mar. 1, 1945.
- ELMER, ARTHUR C. Waterfowl refuge administration in wartime. *Trans. Ninth N. Amer. Wildl. Conf.*: 272-276, 1944.
- ELTON, H. B. Regular breeding of Woodcock in Breconshire and Carmarthenshire. *Brit. Birds*, 38 (10): 197, Mar. 1, 1945.
- ETCHÉCOPAR, R. D. Polymorphisme des oeufs d'oiseaux. *L'Oiseau et Rev. Franç. d'Orn.*, (n. s.) 12 (2, 3, 4): 121-132, 1 pl. (col.), 1942.
- ETCHÉCOPAR, R. D. Le parasite parasité. *L'Oiseau et Rev. Franç. d'Orn.*, (n. s.) 13: 100-102, 1943.
- EY, ALLAN E. Birds breeding in the Millicent district. *So. Austral. Ornith.*, 17 (4): 32-37, Dec., 1944.
- EZRA, ALFRED. Fifty years of aviculture. *Avic. Mag.*, Jubilee Suppl.: 1-3, frontisp. (col., by Roland Green), Nov., 1944.
- FALENER, GUY. An aviary in wartime. *Avic. Mag.*, (5) 9 (6): 135-138, Nov.-Dec., 1944.
- FEDIUSHIN, A. V. Seasonal adaptation reaction (destrobilization) in Cestodes parasitic of non-migratory birds. *Comptes Rendus Acad. Sci. URRS*, 41 (8): 354-355, Dec. 20, 1943.
- FISCHER, RICHARD B. Suggestions for capturing hole-nesting birds. *Bird-Banding*, 15 (4): 151-156, figs. 1-4, Oct., 1944.
- FISHER, JAMES, AND VEVERS, H. G. The breeding distribution, history and population of the North Atlantic Gannet (*Sula bassana*). Part 2. The changes in the world numbers of the Gannet in a century. *Jour. Animal Ecol.*, 13 (1): 49-62, figs. 1-4, May, 1944.
- FLEMING, C. A. A note on the type specimens of *Prion* subspecies. *Emu*, 44 (3): 216-217, Jan. 12, 1945.
- FLETCHER, LAURENCE B. Unusual nesting of House Wrens. *Bird-Banding*, 15 (4): 160-161, Oct., 1944.
- FOSTER, GEORGE S. Some notes on the birds of Hawaii. *Bull. Aud. Soc. New Hampshire*, 15 (4): 136-138, Dec., 1944.
- FRISCH, ROSE E. Growth rates of the primary flight feathers of the pigeon and the effects of X-radiation. *Jour. Exper. Zool.*, 97 (3): 199-229, figs. 1-11, Dec., 1944.

- GABRIELSON, IRA N. Managing the waterfowl. Trans. Ninth N. Amer. Wildl. Conf.: 264-269, 1944.
- GANIER, ALBERT F., AND CLEBSCH, ALFRED. Summer birds of the Unicoi Mountains. Migrant, 15 (4): 61-65, Dec., 1944.
- GANNON, G. R. Are birds conservative? Emu, 44 (3): 235-236, Jan. 12, 1945.
- GINES, HERMANO, AND AVELEDO, RAMON. Contribución ornitológica. Algunas aves de Barlovento. Soc. Ciencias Naturales La Salle, Año 4 (no. 10): 15-18, 2 figs., May-June-July-Aug., 1944.
- GLAUERT, L. A Western Australian Grass Owl. Emu, 44 (3): 229-230, Jan. 12, 1945.—*Tyto longimembris maculosa* (Cranbrook, W. Australia), new subspecies.
- GLEGG, WILLIAM E. The status of the Hoopoe over a period of a hundred years (1839 to 1938). Essex Nat., 27 (10): 158-163, Oct., 1944-Mar., 1945.
- GLENNY, FRED H. A systematic study of the main arteries in the region of the heart. Aves IX. Coliiformes—Part I. Ohio Jour. Sci., 44 (6): 273-276, pl. 1, Dec., 1944.
- GOLDNER, MARTIN G., AND GOMORI, GEORGE. Effect of alloxan on carbohydrate and uric acid metabolism of the pigeon. Proc. Soc. Exper. Biol. & Med., 58 (1): 31-32, Jan., 1945.
- GORDON, SETON. Sea-fowl on the Shiant Islands. Field, 185 (4807): 139, 2 figs., Feb. 10, 1945.
- GRANT, CAPT. C. H. B., AND MACKWORTH-PRAED, LT.-COL. C. W. A new race of *Quelea* from Northern Rhodesia. Bull. Brit. Orn. Club, 64 (no. 453): 65, July 28, 1944.—*Q. cardinalis rhodesiae*, new subspecies.
- GRANT, CAPT. C. H. B., AND MACKWORTH-PRAED, LT.-COL. C. W. Notes on eastern African birds. Bull. Brit. Orn. Club, 64 (no. 453): 66-68, July 28, 1944.
- GRANT, CAPT. C. H. B., AND MACKWORTH-PRAED, LT.-COL. C. W. Notes on eastern African birds. Bull. Brit. Orn. Club, 65 (no. 454): 9-11, Nov. 24, 1944.
- GRANT, CAPT. C. H. B., AND MACKWORTH-PRAED, LT.-COL. C. W. Notes on eastern African birds. Bull. Brit. Orn. Club, 65 (455): 15-17, Feb. 23, 1945.
- GRANT, CAPT. C. H. B., AND MACKWORTH-PRAED, LT.-COL. C. W. On the status of *Cinnyris mediocris moreau* W. L. Slater. Bull. Brit. Orn. Club, 64: 10, 1943.—Type locality changed from Uluguru Mts. to Maskati, Nguru Mts.
- GRAU, C. R., AND ALMQUIST, H. J. Sesame protein in chick diets. Proc. Soc. Exper. Biol. and Med., 57 (2): 187-189, Nov., 1944.
- GRAYCE, ROBERT L. The lure of Cape Ann. Bull. Mass. Aud. Soc., 29 (1): 17-20, 2 figs., Feb., 1945.
- GREB, RAYMOND J. Occurrence of spotted pheasants. Jour. Heredity, 25 (12): 362, fig. 3, Dec., 1944.
- GRIMES, S. A. Birds of Duval County (cont.). Florida Nat., 18 (2): 17-26, 2 pls., 2 figs., Jan., 1945.
- GRISCOM, LUDLOW. Night flight of thrushes and warblers. Bull. Mass. Aud. Soc., 29 (2): 43, Mar., 1945.
- GROSKIN, HORACE. Catbird returns. Bird-Banding, 15 (4): 160, Oct., 1944.
- GROSKIN, HORACE. Eastern Goldfinch makes an 800-mile trip. Bird-Banding, 15 (4): 161, Oct., 1944.
- GROVER, GERTRUDE VILES. Personalities in feathers. Aud. Mag., 47 (1) sect. 1: 23-29, 4 figs., Jan.-Feb., 1945.
- GUNDLACH, RALPH H.; CHARD, RAY D.; AND SKAHEN, J. RICHARD. The mechanism of accommodation in pigeons. Jour. Compar. Psychol., 38 (1): 27-42, pls. 1-4, Feb., 1945.

- HAINES, LAWRENCE C. Albino Kookaburra. *Emu*, 44 (3): 217, Jan. 12, 1945.
- HAINES, LAWRENCE C. Unorthodox nesting sites. *Emu*, 44 (3): 234-235, Jan. 12, 1945.
- HAMLING, H. H. White-throated Swallow (*Hirundo albigularis* Strickl.) found breeding in Southern Rhodesia. *Ostrich*, 15 (3): 228-229, Nov., 1944.
- HAMPE, IRVING E. Notes on birds occurring in the Baltimore area. I—The Robins. *Maryland*, 15 (1): 16-17, Jan., 1945.
- HANNEMANN, MRS. PAUL. Planting for the birds. *Maine Aud. Soc. Bull.* (mimeogr.), 1 (2): 33, Apr., 1945.
- HARBER, D. D. Courtship-feeding of Linnet. *Brit. Birds*, 38 (11): 211, Apr. 3, 1945.
- HARPER, J. A., AND MARBLE, D. R. Egg shape I. Albumen influence. *Poultry Sci.*, 24 (1): 56-60, Jan., 1945.
- HARPER, J. A., AND MARBLE, D. R. Egg shape II. Muscular and other oviducal influences. *Poultry Sci.*, 24 (1): 61-65, figs. 1-2, Jan., 1945.
- HARRISON, HAL H. The bird's debt to the tree. *Amer. Forests*, 51 (3): 114-117, 8 figs., Mar., 1945.
- HARRISON, JEFFERY. The races of Mallards. *Bull. Brit. Ornith. Club*, 64 (no. 453): 58-60, July 28, 1944.
- HARRISON, JEFFERY G., ET AL. Red-necked Grebes in Surrey, Bedfordshire and Leicestershire. *Brit. Birds*, 38 (10): 195-197, Mar. 1, 1945.
- HARRISON, DR. JAMES M. A new race of Blue Tit from Switzerland. *Bull. Brit. Orn. Club*, 65 (455): 13-15, Feb. 23, 1945.—*Parus caeruleus fluckigeri* (Interlaken, Switzerland), new subspecies.
- HARRISON, DR. J. M. A new race of Great Spotted Woodpecker from north Africa. *Bull. Brit. Orn. Club*, 64 (no. 453): 61-63, July 28, 1944.—*Dryobates major lynesi*, new subspecies.
- HAUGEN, ARNOLD O. Bald Eagle nests at Allegan. *Jack-Pine Warbler*, 23 (1): 9-10, pl. 3, Jan., 1945.
- HEATH, WINIFRED. Brazil's fabulous aviary. *Travel*, 84 (3): 16-18, 34, 11 figs., Jan., 1945.
- HENDRICKSON, GEORGE O. Bird-censusing and its values. *Iowa Bird Life*, 15 (1): 2-5, 2 figs., Mar., 1945.
- HENDRICKX, FRED L. Some Kivu birds and their native names. *Ostrich*, 15 (3): 194-212, Nov., 1944.
- HEYWANG, BURT W. The effect of artificial light on laying chickens during hot weather. *Poultry Sci.*, 24 (1): 83-86, Jan., 1945.
- HIGMAN, H. W. Autumn communal roosting of Purple Martins within the city limits of Seattle, Washington. *Murrelet*, 25 (3): 43-44, Sept.-Dec., 1944.
- HILL, D. C.; SLINGER, S. J.; AND MOTZOK, I. Variation in the growth-rate of experimental birds. *Poultry Sci.*, 23 (5): 461-463, Sept., 1944.
- HILL, W. C. OSMAN. Links with aviculture in Ceylon. *Avic. Mag.*, Jubilee Suppl.: 11-14, Nov., 1944.
- HINDWOOD, K. A. Feathers in nest lining. *Emu*, 44 (3): 237, Jan. 12, 1945.
- HINDWOOD, K. A. The noisy Scrub-bird—some early field notes. *Emu*, 44 (3): 236-237, Jan. 12, 1945.
- HIRST, ARNOLD. Colour change in Satin Bower Birds. *Avic. Mag.*, (5) 9 (6): 150, Nov.-Dec., 1944.
- HIRST, ARNOLD. Colour preferences of the Satin Bower-Bird. *Victorian Nat.*, 61 (8): 142-143, Dec., 1944.

- HIRST, ARNOLD. Experiments on colour preferences of the Satin Bower Bird. *Avic. Mag.*, (5) 9 (6): 132-135, Nov.-Dec., 1944.
- HIRST, GEORGE K. Direct isolation of influenza virus in chick embryos. *Proc. Soc. Exper. Biol. and Med.*, 58 (2): 155-157, Feb., 1945.
- HOLLICK, KATHLEEN M. Chiffchaff in Derbyshire in winter. *Brit. Birds*, 38 (11): 214, Apr. 3, 1945.
- HONORATO, R., AND AMO, FRANCISCA. Titulacion de heparina en pollos con avitaminosis K. *Rev. Soc. Argentina Biol.*, 2 (6): 389-392, Oct., 1944.
- HOWARTH, ANITA. A bird feeding station project at Gabriel Richard School Jack-Pine Warbler, 23 (1): 15-16, Jan., 1945.
- HUMPHREYS, G. R. Osprey in Co. Louth. *Brit. Birds*, 38 (10): 195, Mar. 1, 1945.
- HUTT, F. B.; COLE, R. K.; BALL, MARION; BRUCKNER J. H.; AND BALL, R. F. A relation between environment to two weeks of age and mortality from lymphomatosis in adult fowls. *Poultry Sci.*, 23 (5): 396-404, figs. 1-3, Sept., 1944.
- HUTT, F. B., COLE, R. K., ET AL. A relation between environment to two weeks of age and mortality from lymphomatosis in adult fowls. *Poultry Sci.*, 23 (5): 396-404, figs. 1-3, Sept., 1944.
- HUNTER, ISAAC R. Red Jungle Fowl notes. *Aviculture*, (4) 14 (6): 222, Nov.-Dec., 1944.
- HUNT, G. H. Cirl Bunting breeding in Leicestershire. *Brit. Birds*, 38 (11): 211-212, Apr. 3, 1945.
- ISENBERG, A. H. Breeding of Silver-eared Mesias. *Aviculture*, (4) 14 (6): 223-225, Nov.-Dec., 1944.
- IVOR, H. R. Aye, she was Bonnie [Bluebird]. *Nature Mag.*, 37 (9): 473-476, 7 figs., Nov., 1944.
- IVOR, H. R. Rose-breasted Grosbeaks in semi-captivity (cont.). *Aviculture*, (4) 14 (6): 235-236, Nov.-Dec., 1944.
- JACKSON, HARTLEY H. T. Conserving endangered wildlife species. *Trans. Wis. Acad. Sci. Arts and Lett.*, 35: 61-89, figs. 1-2, maps 1-4, 1943.
- JENKINS, HUBERT O. Osprey nesting in Humboldt County, California. *Condor*, 47 (2): 79, Mar.-Apr., 1945.
- JOLLIE, MALCOLM T. Three species of birds new to Boulder County, Colorado. *Condor*, 47 (2): 81-82, Mar.-Apr., 1945.
- JONES, MRS. M. L. Trials of a bird-bander's wife. *Iowa Bird Life*, 15 (1): 9-12, 3 figs., Mar., 1945.
- JUNGHEER, ERWIN. Certain nuclear groups of the avian mesencephalon. *Jour. Comp. Neur.*, 82 (1): 55-76, pls. 1-5, Feb., 1945.
- KAY, G. T. Red-breasted Flycatcher in Shetland. *Brit. Birds*, 38 (11): 213-214, Apr. 3, 1945.
- KELSO, LEON. Bioelectronic observations. III. *Biol. Leaf.*, 28: 1-4, Mar. 15, 1945.
- KELSO, LEON. Robotized research. *Biol. Leaf.*, 27: 1-3, Dec. 30, 1944.
- KERLIN, D. L., AND GRAHAM, ROBERT. Studies on certain filtrable viruses. VII. Antigenic properties of entire embryo fowl pox vaccine. *Proc. Soc. Exper. Biol. and Med.*, 57 (2): 259, Nov., 1944.
- KIMBALL, JAMES W. The development of waste areas on the farm for upland game cover. *Trans. Ninth N. Amer. Wildl. Conf.*: 309-316, 1944.
- KINNEAR, N. B. Mr. W. L. Sclater. *Nature*, 154 (no. 3902): 204, Aug. 12, 1944.—An obituary.
- KIRKPATRICK, G. E. Photographing Andean Condors. *Zoonoos*, 18 (2): 3, cover fig., Feb., 1945.

- KIRKPATRICK, C. M. The bursa of Fabricius in Ring-necked Pheasants. *Jour. Wildl. Manage.*, 8 (2): 118-129, pl. 6, figs. 1-5, Apr., 1944.
- KNOWLTON, GEORGE F. Pentatomidae eaten by Utah birds. *Jour. Econ. Entomology*, 37 (1): 118, June 10, 1944.
- KNOWLTON, GEORGE F., AND MADDOCK, D. R. Insect food of the Western Meadowlark. *Great Basin Nat.*, 4 (3-4): 101-102, Dec. 29, 1943.
- KNOWLTON, GEORGE F., AND WOOD, STEPHEN L. Utah bird predators of the false chinch bug. *Jour. Econ. Entomology*, 36 (2): 332, Aug. 2, 1943.
- KOEHLER, MRS. ARTHUR, AND KOEHLER, GEORGE. A bird study in the Madison cemetery. *Pass. Pigeon*, 7 (1): 15-19, 1 fig., Jan., 1945.
- KOLOSOV, A. M. On the orientation of homing pigeons. *Advances in Modern Biol.*, 18 (1): 83-92, 1944 (in Russian).
- KUTZ, H. L. An improved game bird trap. *Jour. Wildl. Manage.*, 9 (1): 35-38, pl. 2, Jan., 1945.
- LABITTE, ANDRÉ. Recherches sur la durée de la période de reproduction chez quelques oiseaux nicheurs du Pays Drouais. *L'Oiseau et Rev. Franç. d'Orn.*, (n. s.) 13: 29-40, 1943.
- LA RIVERS, IRA. Observations on the nesting mortality of the Brewer Blackbird, *Euphagus cyanocephalus*. *Amer. Midl. Nat.*, 32 (2): 417-437, figs. 1-3, Sept., 1944.
- LARRISON, EARL J. An early spring reconnaissance of the birds and mammals of Northrup Canyon, Upper Grand Coulee, Washington. *Murrelet*, 24 (3): 35-46, figs. 1-16, Sept.-Dec., 1943.
- LASKEY, AMELIA R. Banding nomenclature. *Bird-Banding*, 16 (1): 37-38, Jan., 1945.
- LAWRENCE, C. C. Notes on some migrants. *Emu*, 44 (3): 226-229, Jan. 12, 1945.
- LEFFLER, HERMAN V. Christmas bird census—Audubon Association of the Pacific. *Gull*, 27 (2): Feb., 1945.
- LEGENDRE, MARCEL. La disparition de la Huppe en Normandie et en Bretagne. *L'Oiseau et Rev. Franç. d'Orn.*, (n. s.) 13: 88-92, 1943.
- LEGENDRE, MARCEL. Les variations de plumage et de forme chez les oiseaux. VI. *L'Oiseau et Rev. Franç. d'Orn.*, (n. s.) 12 (1): 52-65, 1942.
- LEGENDRE, MARCEL. Une anomalie de plumage chez la Huppe *Upupa e epops* L. *L'Oiseau et Rev. Franç. d'Orn.*, (n. s.) 12 (2, 3, 4): 181, 1942.
- LEGENDRE, MARCEL. Les variations de plumage et de forme chez les oiseaux. VII (concl.). *L'Oiseau et Rev. Franç. d'Orn.*, (n. s.) 12 (2, 3, 4): 99-106, 1942.
- LEHMANN V., F. CARLOS. Distribucion de *Cathartes urubitinga* en Colombia. *Rev. Univ. Cauca*, no. 3: 187-190, 1 pl., Mar.-Apr., 1944.
- LONDON, LT.-COL. ALAN. Parrakeet breeding in Australia since the war. *Avic. Mag.*, (5) 10 (1): 9-11, Jan.-Feb., 1945.
- LEOPOLD, A. STARKER. Sex and age ratios among Bobwhite Quail in southern Missouri. *Jour. Wildl. Manage.*, 9 (1): 30-34, Jan., 1945.
- LLOYD, SYLVIA. Earlier singing of Blackbird in towns. *Brit. Birds*, 38 (11): 216, Apr. 3, 1945.
- LLOYD, SYLVIA. Tree-Creepers climbing a man. *Brit. Birds*, 38 (11): 213, Apr. 3, 1945.
- LONGSTREET, R. J. Second pelican banding report (1936-44), Mosquito Lagoon Rookery (Brevard Reserve). *Florida Nat.*, 18 (2): 26-35, Jan., 1945.
- LORD, J., AND AINSWORTH, G. H. Reed-Warblers in Yorkshire. *Brit. Birds*, 38 (11): 214-215, Apr. 3, 1945.
- LORENZ, F. W. The influence of diethylstilbestrol on fat deposition in turkeys. *Poultry Sci.*, 23 (5): 458-459, Sept., 1944.

- LOVELL, HARVEY B. Nest desertion by the Spotted Sandpiper. *Maine Aud. Soc. Bull.* (mimeogr.), 1 (2): 43-44, Apr., 1945.
- LOWE, WILLOUGHBY P. A new Banded Rail from the Philippines. *Bull. Brit. Ornith. Club*, 65 (no. 454): 5, Nov. 24, 1944.—*Hypotaenidia torquata maxwelli*, new subspecies.
- MAC ALISTER, E. Earlier singing of Blackbird in towns. *Brit. Birds*, 38 (10): 194, Mar. 1, 1945.
- MACLEAN, ROY P. Cirl Bunting in Yorkshire. *Brit. Birds*, 38 (11): 211, Apr. 3, 1945.
- MANFIELD, H. The breeding in captivity of the Naretha or Little Blue Bonnet Parakeet (*Psephotus narethae*). *Avic. Mag.*, (5) 10 (1): 7-8, Jan.-Feb., 1945.
- MARIA, APOLINAR. Vocabulario de terminos vulgares en historia natural Colombiano (cont.). *Rev. Acad. Colombiana*, 5 (19): 295-307, Dec., 1943.
- MASON, EDWIN A. Invite your bird neighbors to dinner. *Bull. Mass. Aud. Soc.*, 29 (1): 3-14, 17 figs., Feb., 1945.
- MASON, EDWIN A. Parasitism by protocalliphora and management of cavity-nesting birds. *Jour. Wildl. Manage.*, 8 (3): 232-247, figs. 1-3, July, 1944.
- MAXWELL, MAJOR GAVIN. Thoughts upon sea ducks in captivity. *Avic. Mag.*, (5) 9 (4): 87-89, 4 figs., July-Aug., 1944.
- MAYAUD, NOËL. L'avifaune des landes et de la region Pyreneenne Occidentale (cont.). *L'Oiseau et Rev. Franç. d'Orn.*, (n. s.) 13: 41-73, 1943.
- MAYAUD, NOËL. Le Serin Cini en France. *L'Oiseau et Rev. Franç. d'Orn.*, (n. s.) 13: 96-98, 1943.
- MAYNARD, VERA. Song-Thrush hatching three broods in same nest. *Brit. Birds*, 38 (11): 215, Apr. 3, 1945.
- MAYR, ERNST. Birds collected during the Whitney South Sea expedition. 54. Notes on some genera from the Southwest Pacific. *Amer. Mus. Novit.*, no. 1269: 1-8, Dec. 10, 1944.
- MAYR, ERNST. The downy plumage of the Australian Dabchick. *Emu*, 44 (3): 231-233, figs. A-D, Jan. 12, 1945.
- MAZZEO, ROSARIO. Hawk flight in the Berkshires. *Bull. Mass. Aud. Soc.*, 29 (2): 39-41, 1 fig., Mar., 1945.
- MC CLURE, H. ELLIOTT. Comparison of census methods for pheasants in Nebraska. *Jour. Wildl. Manage.*, 9 (1): 38-45, Jan., 1945.
- MC CLURE, H. ELLIOTT. Mourning Dove management. *Jour. Wildl. Manage.*, 8 (2): 129-134, Apr., 1944.
- MC GILL, A. R. Appearance of the Darter. *Emu*, 44 (3): 233-234, Jan. 12, 1945.
- MC GILL, A. R., AND KEAST, J. A. The Mongolian Sand-Dotterel in Australia. *Emu*, 44 (3): 202-216, 1 map, Jan. 12, 1945.
- MC MANNAMA, ZELLA VIDA. Coast Bush-Tits in Whatcom County, Washington. *Murrelet*, 25 (3): 46, Sept.-Dec., 1944.
- MEADE, GORDON M. A study of bird "pox," or "foot disease." *Bird-Banding*, 16 (1): 38, Jan., 1945.
- MENDALL, HOWARD L. Non-game birds in a game management program. *Maine Aud. Soc. Bull.* (mimeogr.), 1 (2): 29-31, Apr., 1945.
- MESSNER, HAZEL W. A visit with Dr. Christofferson and Ne-Ne. *Jack-Pine Warbler*, 23 (1): 12-15, 1 fig., Jan., 1945.
- MISCELLANEOUS. Annual Christmas bird count, 1944. *Chat*, 9 (1): 1-6, Jan., 1945.
- MISCELLANEOUS. Annual midwinter bird count. *Migrant*, 15 (4): 69-72, Dec., 1944.

- MISCELLANEOUS. Audubon field notes. Aud. Mag., 47 (1) sect. 2: 1-14, Jan.-Feb., 1945.
- MISCELLANEOUS. Christmas bird census—1944. Jack-Pine Warbler, 23 (1): 29-33, Jan., 1945.
- MOODY, A. F. An early account of some of the perching birds in the Scampston collection (cont.). Avic. Mag., (5) 9 (6): 143-149, Nov.-Dec., 1944.
- MOODY, A. F. Asiatic Grey-lag Goose. Avic. Mag., (5) 9 (4): 79, July-Aug., 1944.
- MOODY, A. F. The Red-breasted Merganser (*Mergus serrator*) at Lilford. Avic. Mag., (5) 9 (4): 86, July-Aug., 1944.
- MOODY, A. F. The progress and development in ornamental waterfowl keeping. Avic. Mag., Jubilee Suppl.: 20-25, Nov., 1944.
- MORREAU, R. E. A new race of Thrush from Tanganyika Territory. Bull. Brit. Orn. Club, 64 (no. 453): 65-66, July 28, 1944.—*Turdus pelios ubendeensis*, new subspecies.
- MORREAU, R. E. The Half-collared Kingfisher (*Alcedo semitorquata*) at the nest. Ostrich, 15 (3): 161-177, figs. 1-3, Nov., 1944.
- MORREAU, R. E., AND MORREAU, W. M. Do young birds play? Ostrich, 15 (3): 231, Nov., 1944.
- MUNN, L. C. Some experiences of a Screech Owl. Jack-Pine Warbler, 23 (1): 11-12, pl. 4, Jan., 1945.
- MUNRO, GEORGE C. Bird banding in Hawaii. Elepaio (mimeogr.), 5 (7): 43-45, Jan., 1945.
- MUNRO, GEORGE C. Bird banding in Hawaii (cont.). Elepaio (mimeogr.), 5 (9): 56-60, Mar., 1945.
- MUNRO, GEORGE C. Tragedy in bird life. Elepaio (mimeogr.), 5 (8): 48-51, Feb., 1945.—Concerning the recent extirpation of certain birds on Midway Islands.
- NALBANDOV, A. V., AND CARD, L. E. Endocrine identification of the broody genotype of cocks. Jour. Hered., 36 (2): 35-39, figs. 1-2, Feb., 1945.
- NEFF, JOHNSON A. Maggot infestation of nestling Mourning Doves. Condor, 47 (2): 73-76, Mar.-Apr., 1945.
- NESTLER, RALPH B.; BAILEY, WOODROW W.; RENSBERGER, M. J.; AND BENNER, M. Y. Protein requirements of breeding Bobwhite Quail. Jour. Wildl. Manage., 8 (4): 284-289, Oct., 1944.
- NICHOLS, JOHN T. Annual bill-color cycle of the Starling. Bird-Banding, 16 (1): 29-32, Jan., 1945.
- NICHOLSON, JOHN. The Western Blue Bird. Avic. Mag., (5) 9 (6): 138-139, Nov.-Dec., 1944.
- OLIVIER, GEORGES. Capture d'une Sarcelle élégante (*Anas formosa*) en Seine-Inférieure. L'Oiseau et Rev. Franc. d'Orn., (n. s.) 13: 102, 1943.
- OLIVIER, GEORGES. Les grues et la guerre. L'Oiseau et Rev. Franc. d'Orn., (n. s.) 12 (2, 3, 4): 179-180, 1942.
- OLIVIER, GEORGES. Nouvelles observations sur les oiseaux des Pyrénées. L'Oiseaux et Rev. Franc. d'Orn., (n. s.) 12 (1): 14-26, 1942.
- OLIVIER, G. Passages exceptionnels de cygnes en Haute-Normandie durant l'hiver 1941-1942. L'Oiseau et Rev. Franc. d'Orn., (n. s.) 13: 5-8, 1943.
- OLIVIER, GEORGES. Reprise en Seine-Inférieure d'une Bécasse (*Scolopax rusticola*) baguée à Heligoland. L'Oiseau et Rev. Franc. d'Orn., (n. s.) 13: 103, 1943.
- OAKES, CLIFFORD, AND MILLER, G. C. Cirl Buntings in Lancashire. Brit. Birds, 38 (11): 212-213, Apr. 3, 1945.
- PARKS, G. HAPGOOD. Evening Grosbeaks at Hartford, Connecticut. Bird-Banding, 16 (1): 32-36, Jan., 1945.

- PATTEN, ROBERT A. Eye disease in Australian parrots. *Avic. Mag.*, (5) 10 (1): 12-14, Jan.-Feb., 1945.
- PAYNE, OLIVER. Egg of the Cuckoo Finch (*Anomalospiza imberbis imberbis*). *Ostrich*, 15 (3): 235, Nov., 1944.
- PEATTIE, DONALD CULROSS. Mystery of the flyways. *Canad. Nat.*, 7 (2): 58-61, 65, 3 figs., Mar.-Apr., 1945.
- PETTINGILL, OLIN SEWALL, JR. The Puffins of Machias Seal Island. *Maine Aud. Soc. Bull.* (mimeogr.), 1 (2): 25-28, cover fig., Apr., 1945.
- PHILLIPS, C. P. My parrakeets in 1944. *Avic. Mag.*, (5) 10 (1): 17-18, Jan.-Feb., 1945.
- PIERCE, FRED J. The 1944 Christmas bird census in Iowa. *Iowa Bird Life*, 15 (1): 6-9, Mar., 1945.
- PINTO, OLIVIERO. Algumas adendas à avifauna de Monte Alegre. *Papéis Avulsos Dept. Zool.*, S. Paulo., 6 (12): 135-142, Dec. 12, 1944.
- PIRNIE, MILES D. Try Wood Ducks! Jack-Pine Warbler, 23 (1): 16-18, 1 fig., Jan., 1945.
- PLATH, KARL. A talking Budgerigar. *Avic. Mag.*, (5) 10 (1): 15-16, Jan.-Feb., 1945.
- PLATH, KARL. Satin Bower Birds. *Avic. Mag.*, (5) 9 (4): 98, July-Aug., 1944.
- FLOWDEN-WARDLAW, W. J. Northern extension of Canon Wren in British Columbia. *Murrelet*, 25 (3): 46, Sept.-Dec., 1944.
- POMEROY, LT. COL. E. J. Migrations of the Large Striped Swallow. *Ostrich*, 15 (3): 230-231, Nov., 1944.
- PRESTWICH, ARTHUR A. The growth of the Avicultural Society. *Avic. Mag.*, Jubilee Suppl.: 16-18, Nov., 1944.
- PULLEN, N. D. Feeding of Blue Tit nestlings. *Brit. Birds*, 38 (11): 205-210, Apr. 3, 1945.
- PUTNAM, I. D. Information on the Rock Peplar or Black-tailed Parakeet. *Aviculture*, (4) 14 (6): 233-234, Nov.-Dec., 1944.
- RACEY, KENNETH. Extension of range of the Northern Spotted Owl (*Strix occidentalis caurina*). *Canad. Field-Nat.*, 58 (3): 104, May-June, 1944.
- RAINES, R. J. Notes on the territory and breeding behaviour of Blackcap and Garden-Warbler. *Brit. Birds*, 38 (11): 202-204, Apr. 3, 1945.
- RAPINE, J. [Les grues et la guerre.] *L'Oiseau et Rev. Franç. d'Orn.*, (n. s.) 12 (2, 3, 4): 180-181, 1942.
- RAPP, WILLIAM F., JR. The Swallow-tailed Kite in the northeastern states. *Bird-Banding*, 15 (4): 156-160, Oct., 1944.
- REGNIER, V., AND CARIDROIT, F. La teneur en lipides de la crête du coq, de la poule et du chapon. *Comptes Rendus Soc. Biol. (Paris)* (facsim. ed.), 137 (9-10): 261-262, June 8, 1943.
- RICHDALE, L. E. The nestling of the Sooty Shearwater. *Condor*, 47 (2): 45-62, figs. 9-10, Mar.-Apr., 1945.
- RICHDALE, L. E. The Titi Wainui or Fairy Prion, *Pachyptila turtur* (Kuhl). Part II. *Trans. and Proc. Royal Soc. N. Zealand*, 74 (2): 165-181, pl. 21, Sept., 1944.
- RIDOUTT, CESAR A. Las aves del Perú. *Bol. Mus. Hist. Nat.* "Javier Prado," 8 (28-29): 82-88, 1944.
- RIDDLE, OSCAR; RAUCH, VITA M.; AND SMITH, GUINEVERE C. Changes in medullary bone during the reproductive cycle of female pigeons. *Anat. Rec.*, 90 (4): 295-305, fig. 1, Dec., 1944.
- ROBBINS, BENJAMIN H. Effect of penicillin and patulin on fowl pox. *Proc. Soc. Exper. Biol. and Med.*, 57 (2): 215-216, Nov., 1944.

- ROBERTS, AUSTIN. Names of birds described by Andrew Smith in the "South African Commercial Advertiser," Cape Town, May and June, 1829. *Ostrich*, 15 (3): 222-228, Nov., 1944.
- ROUSSEAU-DECELLE, G. À propos des Trochilidés du genre *Oreotrochilus*. *L'Oiseau et Rev. Franç. d'Orn.*, (n. s.) 12 (2, 3, 4): 181-182, 1942.
- ROMANOFF, ALEXIS L. Bio-electric potentials and vital activity of the egg. *Bio-dynamica*, 4 (93-95): 329-358, figs. 1-10, Dec., 1944.
- ROMANOFF, ALEXIS LAWRENCE, AND HUTT, FREDERICK BRUCE. New data on the origin of double avian eggs. *Anat. Rec.*, 91 (2): 143-154, figs. 1-3, Feb., 1945.
- SCHORGER, A. W. Aaron Ludwig Kumlien. *Pass. Pigeon*, 7 (1): 9-14, 1 fig., Jan., 1945.
- SCHORGER, A. W. The Prairie Chicken and Sharp-tailed Grouse in early Wisconsin. *Trans. Wis. Acad. Sci. Arts and Lett.*, 35: 1-59, 1943.
- SCHRADER, THOMAS A., AND ERICKSON, ARNOLD B. Upland game birds of Minnesota. *Minn. Dept. Conserv., Bull. no. 8*: 4-40, fig. 1 and 9 figs., 1944.
- SCHWARTZ, CHARLES W. Bird nests. *Missouri Conserv.*, 6 (4): 4-5, 14-15, 13 figs., Apr., 1945.
- SCOTT, H. M.; JUNGHER, ERWIN; AND MATTERSON, L. D. The effect of feeding sulfanilamide to the laying fowl. *Poultry Sci.*, 23 (5): 446-453, figs. 1-4, Sept., 1944.
- SEMPLE, SUE WYATT. 1945 Christmas bird count. *Kentucky Warbler*, 21 (1): 8-9, winter, 1945.
- SETH-SMITH, DAVID. Notable members in the early days of the society. *Avic. Mag., Jubilee Suppl.*: 29-33, Nov., 1944.
- SHAFTESBURY, ARCHIE D. Lenoxville heron rookery again inhabited. *Chat*, 9 (1): 10-11, Jan., 1945.
- SHARLAND, M. S. R. Social breeding birds. *No. Queensland Nat.*, 12 (73): 1-3, Dec. 1, 1944.
- SIBLEY, CLARENCE L. Breeding of the Pink-footed Goose in captivity in the U. S. A. *Avic. Mag.*, (5) 9 (4): 84-85, July-Aug., 1944.
- SIBLEY, CLARENCE L. Geese and other birds at Sunnyfields Farm, Connecticut. *Avic. Mag.*, (5) 9 (4): 91-95, July-Aug., 1944.
- SIBLEY, C. L. Variation in colour of Blue Geese. *Avic. Mag.*, (5) 9 (4): 89, July-Aug., 1944.
- SIEGLER, HILBERT R., AND NEWMAN, COLEMAN C. The value and practicability of wildlife censuses along highways. *Jour. Wildl. Manage.*, 8 (2): 93-99, fig. 1, Apr., 1944.
- SILVER, ALLEN. Bird feeding then and now. *Avic. Mag., Jubilee Suppl.*: 25-29, Nov., 1944.
- SMITH, HUBERT L. Chirpings from Cuba. *Aviculture*, (4) 14 (6): 217-221, Nov.-Dec., 1944.
- SMITH, STUART G. Display and bower-building in Bower Birds. *Nature*, 154 (no. 3899): 119, July 22, 1944.
- SNYDER, L. L. On the Hudson Bay Eider. *Occ. Pap. Royal Ontario Mus. Zool.*, no. 6: 1-7, May 5, 1941.—*Somateria mollissima sedentaria*, Churchill, Manitoba (on Hudson Bay), new subspecies.
- SOPER, J. DEWEY. Canadian waterfowl management problems. *Trans. Ninth N. Amer. Wildl. Conf.*: 277-281, 1944.
- SOUTER, T. G. Additions to the list of birds for Yorke Peninsula, South Australia. *So. Austral. Ornith.*, 17 (4): 42, Dec., 1944.

- SPOFFORD, WALTER R. Notes on the Peregrine Falcon. *Migrant*, 15 (4): 66-67, Dec., 1944.
- SPOLTON, L. Birds on Terceira of the Azores. *Field*, 185 (4804): 66, January 20, 1945.
- SPRUNT, ALEXANDER, JR. The phantom of the marshes. *Aud. Mag.*, 47 (1) sect. 1: 15-22, 7 figs., Jan.-Feb., 1945.—Concerning the Everglade Kite.
- SQUIRES, W. AUSTIN. Birds of Beechmont, Fredericton, New Brunswick. *Acadian Nat.*, 1 (4): 157-170, Nov., 1944.
- STANTON, FRANK W. Douglas Ground Squirrel as a predator on nests of upland game birds in Oregon. *Jour. Wildl. Manage.*, 8 (2): 153-161, Apr., 1944.
- STAUBER, L. A., AND VAN DYKE, H. B. Malarial infections in the duck embryo. *Proc. Soc. Exper. Biol. and Med.*, 58 (2): 125-126, Feb., 1945.
- STEEN, MELVIN O. The significance of population turnover in upland game management. *Trans. Ninth N. Amer. Wildl. Conf.*: 331-337, 1944.
- STEGGERDA, MORRIS, AND HOLLANDER, W. F. Observations on certain shell variations of hens' eggs. *Poultry Sci.*, 23 (5): 459-461, fig. 1, Sept., 1944.
- STEVENS, O. A. Fifteen years banding at Fargo, North Dakota. *Bird-Banding*, 15 (4): 139-144, Oct., 1944.
- STEVENS, RONALD. Hand-rearing fresh-water ducklings. *Avic. Mag.*, (5) 9 (4): 80-83, July-Aug., 1944.
- STOLL, R. Action de quelques hormones sur le développement des canaux de Muller de l'embryon de Poulet. *Comptes Rendus Soc. Biol. (facsim. ed.)*, 138 (3 & 4): 103, 1944.
- STONEHAM, H. F. First Kenya record of Temminck's Stint. *Jour. E. Africa Nat. Hist. Soc.*, 17 (5 & 6): 396, July, 1944.
- STONER, EMERSON A. The Black Rail at Benicia, California. *Condor*, 47 (2): 81, fig. 12, Mar.-Apr., 1945.
- STORER, ROBERT W. A winter record for the House Wren in Berkeley. *Gull*, 27 (3): 9, Mar., 1945.
- STOTT, KEN, JR. Breeding condors. *Zoonoos*, 18 (2): 3-4, 2 figs., Feb., 1945.
- STOUDT, JEROME H. Food preferences of Mallards on the Chippewa National Forest, Minnesota. *Jour. Wildl. Manage.*, 8 (2): 100-112, fig. 1, Apr., 1944.
- STUART, DAVID. Whooper Swans summering in Bute. *Brit Birds*, 38 (10): 195, Mar. 1, 1945.
- SUTTON, MAJOR GEORGE MIKESCH. At a bend in a Mexican river (cont.). *Aud. Mag.*, 47 (1): sect. 1: 35-40, 4 figs., Jan.-Feb., 1945.
- TALBOT, R. W. Crows killing lambs and ewes. *Ostrich*, 15 (3): 240, Nov., 1944.
- TAYLOR, J. Long-tailed Tits still feeding presumed young in autumn. *Brit. Birds*, 38 (11): 213, Apr. 3, 1945.
- TAYLOR, J. SNEYD. Notes on the South African Shelduck (*Casarca cana* Gm.). *Ostrich*, 15 (3): 188-193, Nov., 1944.
- TEMPERLEY, GEORGE W. Sabine's Gulls in County Durham. *Brit. Birds*, 38 (11): 217, Apr. 3, 1945.
- TEST, FREDERICK H. Molt in flight feathers of flickers. *Condor*, 47 (2): 63-72, fig. 11, Mar.-Apr., 1945.
- TIXIER-DURIVAUT, ANDRÉE. Contribution a l'étude de l'innervation du coeur chez l'oiseaux. *L'Oiseau et Rev. Franç. d'Orn.*, (n. s.) 12 (2, 3, 4): 81-98, figs. 1-6, 1942.
- UHLER, FRANCIS M. Control of undesirable plants in waterfowl habitats. *Trans. Ninth N. Amer. Wildl. Conf.*: 295-303, 1944.

- USSHER, ARLAND. Nesting habits of Red-throated Rock-Martin (*Ptyonoprogne r. rufigula*). Jour. E. Africa Nat. Hist. Soc., 17 (5 & 6): 399, July, 1944.
- VALENTINE, K. A. The Inca Dove at State College, New Mexico. Condor, 47 (2): 80-81, Mar.-Apr., 1945.
- VAN ROSSEM, A. J. The eastern distributional limits of the Anna Hummingbird in winter. Condor, 47 (2): 79-80, Mar.-Apr., 1945.
- VAN ROSSEM, A. J. The Golden-crowned Kinglet of southern California. Condor, 47 (2): 77-78, Mar.-Apr., 1945.
- VAN SOMEREN, DR. V. G. L. Some new records from Uganda. Bull. Brit. Ornith. Club, 65 (no. 454): 8-9, Nov. 24, 1944.
- VAN SOMEREN, DR. V. G. L. The onset of sexual activity in birds. Bull. Brit. Ornith. Club, 65 (455): 19-24, Feb. 23, 1945.
- VINCENT, LT.-COL. JACK. A new race of *Cisticola* from Portuguese East Africa. Bull. Brit. Orn. Club, 64 (no. 453): 63-64, July 28, 1944.—*C. chiniana emendata*, new subspecies.
- VINCENT, J. Nesting site of the Banded Sandmartin. Ostrich, 15 (3): 237, Nov., 1944.
- VINCENT, J. On the occurrence of Namaqua Sandgrouse in Natal. Ostrich, 15 (3): 235-236, Nov., 1944.
- VON JARCHOW, B. L. Woodpeckers' nests. Pass. Pigeon, 7 (1): 5-8, figs. 1-2, Jan., 1945.
- VORHIES, CHAS. T. Another record of the Purple Gallinule in Arizona. Condor, 47 (2): 82, Mar.-Apr., 1945.
- VORHIES, CHARLES T. Black-bellied Tree Ducks in Arizona. Condor, 47 (2): 82, Mar.-Apr., 1945.
- WALKINSHAW, LAWRENCE H. Field Sparrow, 39-54015. Bird-Banding, 16 (1): 1-14, Jan., 1945.
- WARREN, D. C.; MUELLER, C. D.; AND HUTT, F. B. Inheritance of ungual osteodystrophy in the fowl. Jour. Heredity, 35 (12): 355-358, figs. 1-1, Dec., 1944.
- WATERS, NELSON F. The weight of chicken eggs as influenced by diallel crossing. Poultry Sci., 24 (1): 81-82, Jan., 1945.
- WATSON, C. W. A cooperative approach to farm game management. Trans. Ninth N. Amer. Wildl. Conf.: 304-309, 1944.
- WELLER, LOUISE C. The Dodo. Aviculture, (4) 14 (6): 226-227, Nov.-Dec., 1944.
- WETHERBEE, OLIVE P. Living young Tree Swallows attacked by carrion beetle. Bird-Banding, 16 (1): 37, Jan., 1945.
- WETMORE, ALEXANDER. A review of the Giant Antpitta *Grallaria gigantea*. Proc. Biol. Soc. Wash., 58: 17-20, Mar. 21, 1945.—*G. g. hylodroma* (Guala, Ecuador) and *G. g. lehmanni* (San Marcos, Cauca, Colombia) new subspecies.
- WETMORE, ALEJANDRO. Observaciones sobre la ornitología de la zona sur de Veracruz, Mexico. Rev. Soc. Mex. Hist. Nat., 5 (3-4): 263-271, Dec., 1944.
- WETMORE, ALEXANDER. Remains of birds from the Rexroad fauna of the upper pliocene of Kansas. Univ. Kans. Sci. Bull., 30 (9) part 1: 89-105, figs. 1-19, May 15, 1944.—*Nettion bunkeri*, *Colinus hibbardi*, *Rallus prenticei* (Upper Pliocene, Meade County), new species.
- WETMORE, ALEXANDER. The subspecific characters and distribution of the New World Skimmers (*Rynchops nigra*). Caldasia (Bogotá), no. 11: 111-118, July 20, 1944.
- WHARTON, WILLIAM P. Chickadee and Catbird returns. Bird-Banding, 16 (1): 37, Jan., 1945.

- WHARTON, WILLIAM P. Two interesting age records. *Bird-Banding*, **15** (4): 160, Oct., 1944.
- WHITE, C. M. N. A new race of barbet from Northern Rhodesia. *Bull. Brit. Ornith. Club*, **65** (455): 18-19, Feb. 23, 1945.—*Buccanodon sowerbyi buttoni* (Ndola, Northern Rhodesia), new subspecies.
- WHITE, C. M. N. A new race of francolin from Northern Rhodesia. *Bull. Brit. Ornith. Club*, **65** (no. 454): 7-8, Nov. 24, 1944.—*Francolinus albogularis meinetshageni*, new subspecies.
- WHITE, C. M. N. New races of lark, pipit, and cordon bleu from Northern Rhodesia, Angola, and the Belgian Congo. *Bull. Brit. Ornith. Club*, **65** (no. 454): 5-7, Nov. 24, 1944.—*Mirafr africana gomesi*, (southeast Angola), *Anthus vaalensis muhlingae*, (Belgian Congo), *Uraeginthus bengalus semotus*, (Northern Rhodesia), new subspecies.
- WHITE, C. M. N. Some Lunda and Lwena bird names. *Ostrich*, **15** (3): 232-234, Nov., 1944.
- WILLIAMS, C. B. Some applications of the logarithmic series and the index of diversity to ecological problems. *Jour. Ecol.*, **32** (1): 1-44, figs. 1-45, May, 1944.
- WILLIAMS, RALPH. Little Owl attacking and carrying off Jackdaw. *Brit. Birds*, **38** (10): 194-195, Mar. 1, 1945.
- WODZICKI, K. A., AND EYLES, JAS. R. White phase of the Reef-Heron (*Demigretta sacra*) in New Zealand. *Emu*, **44** (3): 181-182, Jan. 12, 1945.
- WOOD, K. A. Quail alighting on the sea. *Brit. Birds*, **38** (10): 198, Mar. 1, 1945.
- YEALLAND, JOHN. Full-winged Tree Ducks. *Avic. Mag.*, (5) **9** (4): 90-91, July-Aug., 1944.
- YOUNG, JAMES B. Distinguishing characteristics of the immature Black-poll and Bay-breasted Warblers. *Kentucky Warbler*, **21** (1): 1-3, winter, 1945.
- YOUNGORTH, WM. Fall notes from northwest Iowa. *Iowa Bird Life*, **15** (1): 13, Mar., 1945.
- ZIEGLER, O. Des *Fulmarus g. glacialis* (L.) trouvés en été dans le Golfe de Gascogne. *L'Oiseau et Rev. Franç. d'Orn.* (n. s.) **13**: 95, 1943.

NOTES AND NEWS

MR. JAMES L. PETERS, President of the A. O. U. and Assistant Secretary of the International Commission on Zoological Nomenclature, has been elected Vice-President of the Commission to succeed the late Dr. C. W. Stiles.

DR. ALEXANDER WETMORE, lately appointed Secretary of the Smithsonian Institution, has been elected to membership in the National Academy of Sciences.

DR. ALBERT KENRICK FISHER, one of two surviving Founders of the A. O. U. and a former President, was given a surprise dinner by a number of his friends in Washington on the evening of March 21, in celebration of Dr. Fisher's 89th birthday. His long association with the A. O. U. and with the U. S. Biological Survey (now the Fish and Wildlife Service) and his numerous publications of birds, including the well-known 'Hawks and Owls of the United States' (1893), have made his name familiar to many ornithologists who have not had the pleasure of meeting Dr. Fisher in person.

CONTRIBUTORS to 'The Auk' who have not received the reprints of their papers in recent numbers of the journal are asked to be patient with the editor and the printers. Present conditions have delayed the printing of these extracts but the orders are on file and the copies will be sent as soon as they are off the press.

COPIES of the Twentieth Supplement to the A. O. U. Check-List, published in this issue, may be obtained from the Business Manager, Mr. Frederick C. Lincoln, Fish and Wildlife Service, U. S. Dept. Interior, Washington (25), D. C. Price 25c.

THE TREASURER of the A. O. U. is happy to announce that the funds of the Society have been enriched by the generous gift of \$1000.00 presented by Vice-President Hoyes Lloyd of Ottawa, Canada. This is a welcome addition to our resources and should serve as an incentive to other members and friends of the Union.

THE AUK

A Quarterly Journal of Ornithology

ORGAN OF THE AMERICAN ORNITHOLOGISTS' UNION

Manuscripts should be typewritten, double-spaced, if possible. Titles should be brief, within one printed line. Avoid footnotes. References to literature may be inserted in parentheses in the text or listed at the end of the paper; consult recent issues of 'The Auk' for the style of citation used. Long articles should have a brief summary at the end. Mark copy only for *italics*. Avoid Roman numerals and extensive or ruled tables. Line drawings should be in India ink on white paper or cardboard; if reduction will be necessary, details must be correspondingly bold. Captions should be brief; discussions belong in the text. Common and Latin names of North American birds should follow the A. O. U. Check-List except in taxonomic papers giving formal discussions of the changes. Except on request, no proofs of 'General Notes' or short communications will be sent to authors.

Twenty-five reprints of leading articles are furnished authors free of charge. Reprints from 'General Notes,' 'Correspondence,' etc., and those from leading articles in excess of twenty-five must be paid for by the author, and must be ordered from the editor when the manuscript is submitted. Printed covers can be furnished at additional cost.

All articles and communications intended for publication and all books and publications intended for review should be sent to the Editor.

JOHN T. ZIMMER

*American Museum of Natural History
79th Street and Central Park West
New York 24, N. Y.*

Information relative to advertising, subscriptions, requests for back numbers of 'The Auk,' as well as for other publications of the Union, changes of address and remittances should be sent to the Treasurer and Business Manager. Claims for replacement of missing or defective copies of 'The Auk' will not be honored unless received by the Business Manager within six months of publication of the particular number involved.

FREDERICK C. LINCOLN

*Fish and Wildlife Service
Department of the Interior
Washington 25, D. C.*

OFFICERS OF THE AMERICAN ORNITHOLOGISTS' UNION

President: JAMES L. PETERS, Museum of Comparative Zoölogy, Cambridge, Massachusetts.

Vice-Presidents: GEORGE WILLETT, Los Angeles Museum, Los Angeles, California.

HOYES LLOYD, 582 Mariposa Ave., Rockcliffe Park, Ottawa, Canada.

Secretary: DR. LAWRENCE E. HICKS, Ohio Wildlife Research Station, Ohio State University, Columbus, Ohio.

Treasurer and Business Manager: FREDERICK C. LINCOLN, Fish and Wildlife Service, Dept. of the Interior, Washington 25, D. C.

WANTED

To complete sets of 'The Auk' in institutional and other libraries, the Treasurer and Business Manager is prepared to purchase the following issues: 1886, January and October; 1887, January; 1888, January and October; 1889, entire volume; 1890, October; 1892, January and October; 1908, July and October; 1911, July; 1924, October; 1928, January; 1929, January and April; 1930, January; 1936, April and October; 1937, January, April, and July; 1938, April, July, and October; and 1940, January.

If you do not intend to keep any of these issues that you may have, the A. O. U. will pay as much as or more than any second-hand dealer and by turning them in to stock you will be aiding college, university and other libraries that desire to maintain complete sets of our journal.

Members who have been elected in recent years and who desire to obtain back numbers of 'The Auk' should file their needs promptly. It is suggested that those ordering series do this by ten-year periods, as 1901-1910, 1911-1920, 1921-1930, etc.

FREDERICK C. LINCOLN

Treasurer and Business Manager

Fish and Wildlife Service

Department of the Interior

Washington 25, D. C.